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The Journal of THE AMERICAN DIETETIC ASSOCIATION

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1931

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The Journal of

The American Dietetic Association

THE HISTORY OF THE TREATMENT OF DIABETES BY DIET*

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The investigation of diabetes and the growth of knowledge concerning nutrition have proceeded hand in hand, and have gradually led to the more successful treatment of the disease. There is still, however, remarkable lack of uniformity in treatment. Patients suffering from diabetes are being treated by specialists with scientific accuracy, but as there is not scientific agreement in their methods, practitioners are naturally bewildered by the apparent confusion of the situation.

Diabetes has been known since ancient times, and recommendations regarding the diets of patients are contained in even the earliest accounts of the disease. It was not until the end of the eighteenth century, however, that any really effective treatment was applied. In general, it was considered desirable to prescribe an abundance of food to combat progressive emaciation, but it was recognized that the progress of the disease was seldom affected. In the beginning, attention was directed chiefly to increasing the comfort of the patient by the use of such bland foods and soothing drinks as could best be tolerated when extreme dehydration had caused soreness of the mouth and tongue. Aretaeus, more than seventeen hundred years ago, first described diabetes and recommended a diet of milk, cereals and gruels. In the seventeenth century, Willis, whose name is memorable for the recognition of the sweetness of diabetic urine, gave directions with the same purpose in mind. He said: "The vital intention is performed by an incrassating and moderately cooling diet, by refreshing cordials and proper and seasonable hypnotics." The view that abnormal digestion occurred in persons with diabetes led to

* Submitted for publication January 15, 1930.

emphasis on the use of food assumed to be easily digested. Sydenham, a contemporary of Willis, recommended "veal, mutton and the like" on this account, and warned against the use of "all sorts of fruits and garden stuff."

Dobson, in 1775, pointed out that the sweet taste of the urine of diabetic patients is due to sugar. The demonstration of the loss of sugar from the body later led to the theory that sugar should be fed to such patients to replace that excreted. It was assumed that a ferment created a demand for sugar which would cause breakdown and formation of sugar from the constituents of the body, unless a sufficient amount were fed to satisfy the demand. In the light of present knowledge this theory appears absurd, but it seemed reasonable enough at the time. It was not abandoned until many years of clinical trial showed its fallacy. The increased excretion after the ingestion of sugar apparently was often overlooked. Two articles on the use of sugar in the treatment of diabetes appeared in the *British Medical Journal* in 1857. The first article described temporary improvement after the daily administration of several ounces of sugar to a patient who had been losing ground on a meat diet. The second article contradicted the conclusions of the first. This treatment in two cases led to serious aggravation immediately. It is related that Schiff, a celebrated physician and scientist of the last century and a strong advocate of this theory, himself died of diabetes. Although the disease began in his old age, it ran an unusually severe and rapid course. Naunyn suggested that the rapid course was due to the fact that Schiff followed his own theory, and during his illness ate sugar in large quantities. Apparently he died a martyr to his own mistaken idea.

The systematic treatment of diabetes by diet dates from 1796, when John Rollo, an English physician, reported remarkable results in a case in which treatment was carried out by means of an animal diet. The patient was a soldier, aged thirty-four years. He had been a heavy eater and drinker, and before the onset of diabetes weighed about two hundred forty pounds. He began to lose weight rapidly, and in seven months had lost seventy pounds. The urine measured twelve liters in one day. Before treatment was begun, he was eating mixed food and was drinking syrup. The diet prescribed consisted of a large quantity of meat and eggs with a little bread, butter and milk at breakfast. Improvement was rapid; the quantity of urine decreased; and the patient regained strength and weight. The diet was increased and in six months he began to eat regular meals. He maintained good health, although it is not certain that the urine remained free from sugar.

This patient apparently had the mild diabetes commonly associated with obesity. It had become aggravated by overeating, and recovery was spectacular. Further observations by Rollo demonstrated clearly the value of the change of diet. From this time on, almost all physicians agreed that the chief feature of any treatment of diabetes must be the diet. Dependence on medicinal remedies which had formerly dominated treatment now declined, yet drugs of all kinds were used until recent years. Even textbooks published in the twentieth century had not excluded lists of drugs of unproved value.

In time it was realized that the animal diet of Rollo exerted its beneficial effects through the restriction of carbohydrate. The use of large quantities of meat for prolonged periods was distasteful to so many patients that efforts were made to provide other foods low in carbohydrate. Bouchardat, a Frenchman who practiced in the middle of the last century, is credited with making much progress in treatment by diet. He realized the value of green vegetables which today play such an important part in the diet of patients with diabetes. In 1841, he prepared gluten bread, a food which has been used and abused by countless patients since that time. The false impression that gluten bread exerted a curative effect on diabetes, and that the advantage would be in proportion to the amount eaten, was common in the last century and is often encountered even today. Garrod found it necessary to point out, in 1857, that it is of value only in proportion as it enables the patient to abstain from carbohydrate food. The fact that gluten might, in addition, cause the formation of considerable sugar was also recognized at that time.

Efforts to find articles of food low in carbohydrate led to the introduction of many other preparations which have been popular until the present day. Cakes made from washed bran were introduced about 1850 by Camplin, a physician who suffered from diabetes. Soy beans were used by French physicians in 1888 to make a substitute for bread. This proved to be a useful and inexpensive food. During the last century, descriptions of plans for diets low in carbohydrate have appeared in the medical literature of all countries. In England, the chief authorities were Prout, Pavy, and Garrod; in France, Bouchardat; in Italy, Cantani; and in Germany, Seegen, Kulz and, later, Naunyn. America followed the lead of Europe.

Certain individuals began to realize the need for restriction of protein in addition to restriction of carbohydrate. In the more severe cases, patients failed to respond to simple restriction of carbohydrate; indeed,

they often became worse. There can be no doubt that much harm occurred from restriction of carbohydrate with an unrestricted allowance of protein and fat, since patients were often advised to eat all the protein and fat they could take. It was finally recognized that meat as well as starch might lead to the formation of sugar. Prout, as early as 1820, had observed that an unlimited amount of meat was harmful, and later Bouchardat, Cantani, Naunyn, and others arrived at the same conclusion. Definite proof of the formation of sugar from meat was furnished by von Mering and Minkowski through their studies of the D:N ratio of depancreatized dogs. It was not easy to overcome the practice of the ingestion of large quantities of protein, for the enormous excretion of urea in the urine of many patients led to the strong belief that much protein was needed to compensate for unusual destruction of protein in the body. It was not realized that the high excretion of urea was due chiefly to treatment with excessive quantities of meat and not to the disease itself.

The next step in the evolution of the diet of patients with diabetes was the restriction of the total food supply. Some of the leaders of the last century, particularly Cantani, Naunyn, and von Noorden, realized the advantage of limitation of food, and observed that glycosuria might be checked by occasional days of fasting. Guelpa, in 1914, reported benefit obtained in severe cases of diabetes through fasting for prolonged periods. Purgation was also a significant feature of the treatment, for his purpose was to combat or prevent the auto-intoxication, which he believed to be present. Although his hypothesis was fallacious, the results of his treatment made a strong impression. As is often the case, erroneous hypotheses may lead to advances of practical value.

Allen, also in 1914, by methods based on animal experimentation and careful clinical studies, demonstrated that glycosuria could be checked by fasting, even in severe cases, and that life could be maintained by an extremely small amount of food. This treatment was adopted by Joslin with great enthusiasm. In a paper written in 1915, he said, ". . . . the advance in the actual treatment of diabetes mellitus during the twelve months just passed has been greater than in any year since Rollo's time. . . . . Thanks to Dr. Frederick M. Allen we no longer nurse diabetics, we treat them. . . . . A review of all my private cases of diabetes has convinced me that prolonged fasting has produced results far and away ahead of any methods which I have hitherto employed." Fasting made it possible to check glycosuria quickly as a rule, and the use of a diet planned to maintain nutrition at a low level tended to prevent

its return. With control of glycosuria, improvement occurred. The reduction in the death rate and the extension of life, even in severe cases, made the starvation treatment popular.

Although undernutrition kept the patient alive, his activities were necessarily curtailed in proportion to the reduction of his food. Two requirements in treatment were recognized, first, that the quantity of food must be within the tolerance of the body for sugar, and second, that the diet must have sufficient calories to maintain health and strength. Undernutrition usually fulfilled the first requirement, but often at the expense of the second. Efforts to supply more nourishment were hampered by the fact that glycosuria and ketosis were likely to result from more food. Help in the solution of the problem came with the development of balanced diets. Woodyatt, in 1921, clearly presented the aims of diet adjustment in diabetes. He pointed out that, besides reducing the quantity of glucose entering the metabolism from all sources below the quantity which can be utilized without abnormal waste, it was important to adjust the supply of fatty acids in relationship to the quantity of glucose. He showed that fat could be fed with safety as long as the ratio of grams of fatty acid to grams of glucose utilized did not exceed 1.5:1. This conclusion was based on the assumption that one molecule of glucose is necessary for the complete oxidation of one molecule of aceto-acetic acid. Newburgh and Marsh in this country, and Pétren in Sweden, demonstrated by clinical trial that even more fat could be used, with safety, to maintain normal nurition. The studies of Schaffer and Wilder showed that the formation of acetone bodies in significant amounts occurred only when the molecular ratio of ketogenic materials in glucose-forming materials was in excess of 2:1. Wilder, therefore, was able to make plans to provide the patient who was suffering from severe diabetes with the maximal amount of food which his tolerance would permit. His formulas for calculation of the diet simplified and increased the safety of planning a diet. Formulas based on the same principles were arranged by Campbell and others.

The development of the diet before the introduction of insulin passed through four stages: (1) restriction of carbohydrate; (2) restriction of protein and carbohydrate; (3) restriction of the total food supply; and (4) balance of the diet to prevent ketosis, providing, as far as possible, adequate nutrition. The analysis of these principles, made by Wilder in 1922, and the directions he outlined for diet adjustment, summarized the chief advances made in treatment by diet.

When treatment by diet had reached its most successful point, insulin

was discovered. Insulin did not take the place of treatment by diet, but it changed the requirements. Readjustment of methods of treatment took place rapidly. Before passing on to the developments which followed the introduction of insulin, mention should be made of certain features of treatment which received great attention in earlier years.

Almost every authority on diabetes devised a complicated plan of treatment. Great advantage was thought to be derived from changes made in the diet from day to day. Fast days, fat days, vegetable days, oatmeal days, and mixed diet days, were advised alternately and successively in various arrangements. The technic of treatment was complex. Fortunately, present-day treatment is comparatively simple.

Much confidence was placed in the virtues of certain foodstuffs. One of the oldest "cures" was the milk diet introduced by Donkin, in 1869. His first report was based on the treatment of three cases, and he was so enthusiastic over the results that he stated "In all probability milk will be found to be the most potent remedy we shall ever become acquainted with in the treatment of diabetes." This was a strong statement, considering the fact that it was based on the observation of only three cases. Even today, however, sweeping statements are made with as little evidence. Many persons were impressed, and the milk diet was used to a considerable extent. Raw meat was recommended by Lauder Brunton because of the belief that it contained glycolytic ferments which would check diabetes. The rice "cure" was advocated by von During, potatoes by Mosse, oatmeal by von Noorden, and a combination of cereals by Falta. The oatmeal cure, perhaps, enjoyed greatest popularity. The usual procedure was to give one hundred and fifty to two hundred and fifty grams of oatmeal, cooked with an equal amount of butter. This allowance was given in five or six feedings during the day, not a very attractive diet but fortunately used only for short periods. Beneficial results were attributed to some mysterious virtue of the food in all of these treatments. The results can probably be explained satisfactorily on other grounds, the use of polysaccaride carbohydrate with slow digestion and slow delivery for utilization, the limitation of protein or the limitation of total calories. Undernutrition might be the most important factor. In fact, it was suggested that not the diet, but the fast days, which were a usual part of certain courses of treatment, were responsible for improvement.

Before insulin was available, acidosis was the great danger for persons with diabetes. Fat was needed in the diet to supply sufficient nourishment, but unless balanced with the proper quantity of sugar-forming

material, would give rise to poisonous acetone bodies. Ringer, in 1913, pointed out that only fats with an even number of carbon atoms would form acetone bodies, but, unfortunately, all the edible fats in the animal and vegetable kingdoms are of this kind. The possibility of synthesizing a fat with an odd number of carbon atoms was suggested. This achievement was accomplished by Kahn, in 1923. It is claimed that this fat may be used as a satisfactory food without risk of ketosis. A material such as this would no doubt have been of great value before the introduction of insulin. At the present time it is not needed, since insulin makes it possible to use an adequate amount of ordinary food. It is unfortunate that the discovery of this fat, like the knowledge of the mechanism of ketosis, came almost too late to be of much service. Such discoveries would no doubt have prolonged the lives of countless patients. Now that insulin is available they are not required.

The discovery of insulin has changed the problem of diet in diabetes. Previously it was necessary to limit the intake of food to meet the ability of the body to utilize it. With insulin it is possible to give even the patient with severest diabetes an adequate diet. The problem, at present, is to determine the best way in which to maintain complete control of the disease, preserve good nutrition, and yet permit the patient to maintain, so far as possible a normal existence. The liberty which insulin gives in dieting has led to further diversity of treatment, and totally different plans are used by different authorities. Each plan has its advantages and disadvantages.

Certain physicians continue to prescribe diets much like those prescribed before insulin was available. Carbohydrate and protein are restricted to small quantities, and fat is given in large quantities to supply sufficient nourishment. The advantage of this plan is that glycosuria and hyperglycemia may be controlled with great ease, and insulin is needed for a small percentage of severe cases only. The use of insulin is troublesome and inconvenient, and although injections of insulin cannot be considered a hardship when life depends on them, most patients are happier without insulin when such a practice is feasible. The disadvantage of the plan is that a restricted diet is monotonous and unpleasant. Furthermore, it may be deficient in some respect unless great care is taken in the selection of the food.

In any consideration of the treatment of diabetes, it must be kept in mind that it is the patient who is to be treated and not the disease. Modern treatment must be designed not merely to keep the victim of diabetes alive, but to keep him in comparative health and happiness.

The diet must be planned to suit his habits and personal preference as far as possible. Often patients have been advised to follow diets which were distasteful. One should remember the aphorism of Hippocrates, the Father of Medicine: "An article of food or drink which is slightly worse but more palatable is to be preferred to such as are better but less palatable."

Attempts to use diets like those used by normal persons are naturally being made. Diets with an allowance of carbohydrate and protein approaching that of the normal diet, with a relatively small allowance of fat, are employed. The advantage of such a plan is that the patient may enjoy more pleasing meals. The disadvantage is that insulin is required for many patients, and the dosage employed, although not as large as one might expect, is still so large that the expense of treatment is a serious consideration to the average patient. The danger of severe reactions from insulin is also to be feared. Furthermore, the possibility of complete control of glycosuria and hyperglycemia seems more difficult, so that prospects of recovery of pancreatic function are less likely. This is a question which is under discussion.

The most common policy at present seems to be the avoidance of extremes and the adoption of a middle course. Drastic restriction in diets is abandoned because it inflicts needless hardship on the patient. Carbohydrate and protein are restricted to a moderate degree, so that the use of insulin can be avoided in more than half the cases. Insulin when needed is employed in comparatively small doses; the expense is therefore inconsiderable, and the risk of severe hypoglycemic reactions is minimized. The allowance of carbohydrate and protein is made large enough to permit the selection of an agreeable variety of food with an adequate supply of protective foods. Fat is employed in an amount sufficient to meet the required calories. The fear has been expressed that the use of fat in more than the normal proportion may lead to arteriosclerosis. Arteriosclerosis is common in persons with diabetes and is a serious problem, but the hypothesis that eating fat may cause arteriosclerosis is not supported by definite evidence. Arteriosclerosis may occur in patients with diabetes who are treated in any way, and, in fact, is perhaps most common and most advanced in patients with mild diabetes of long duration who have not submitted to any treatment.

Thus far I have considered the theories which have guided physicians in planning the diets of patients suffering from diabetes. More important than the theories are the methods by which they are put into practice. In this generation more than any other, it has been recognized

that treatment cannot be carried out successfully unless the patient is thoroughly trained to follow instructions. The systematic education of such patients, according to the methods of Joslin, Woodyatt, and Wilder, is becoming universal, so that treatment in general is more effective than ever before.

The part played by dietitians in the treatment of diabetes is well known to everyone. The skillful supervision of diets not only has insured success in the treatment of patients, but has made possible accurate clinical investigation of the disease. The assistance of the dietitian in the education of patients has been of untold value.

THE PRESENT STATUS OF HUMAN MILK PRODUCTION*

B. RAYMOND HOOBLER, A.M., M.D.

Detroit

A survey of the literature for the last twenty-five years reveals that many researches have been carried out to determine the proper feeding of dairy cattle for the purpose of increasing milk production. Comparatively little appears to have been done to stimulate the study of maternal nursing or to determine the factors influencing human lactation. As a preliminary study of the relationships between nutrition and a failing milk supply, a summary is presented of the work done in the field of human milk production. Some of the material is copied verbatim from original sources, and much of it is paraphrased, but no claim is made of originality and the authors of the statements made are given credit where possible.

Though the advantages, in general, of breast feeding are almost universally acknowledged, surprisingly little toward educating the public has been attempted. This is particularly true because the physician himself has not known just what to tell an inquiring mother when he is asked to suggest methods of maintaining an adequate, or of recovering a failing milk supply. The question naturally arises whether or not all mothers with a will to nurse their young can be taught to do so. This question was answered in the affirmative by Sedgwick (1) who conducted a campaign of publicity, in his now historical Minneapolis experiment. Matilda Carlson, R.N., (2) who coöperated with Sedgwick, tells of her work under his direction. She visited each mother shortly after the baby was born and gave such instruction as was necessary. So successful was this plan that all the infants supervised nursed from the breast from four to ten months.

The criticism of the Minneapolis experiment was that the favorable results were due to the racial stock predominating, and that the determining factor was the type of mother. The work of Richardson (3) in New York State shows this criticism to be untrue. The fact is brought out,

* Received for publication January 8, 1930. The author is attempting a study of diets which will produce an adequate human milk supply, and would welcome any suggestions, based on experience, which may be of help in determining what should be omitted and what included in such a diet.

incidentally, that of all the racial stocks the American mother is the poorest milk producer under the régime now laid down for her by her medical advisors. The one outstanding factor in the success of the Minneapolis experiment was the practise of manual expression of milk from the breasts until they were emptied, if any milk remained in the breasts after the baby had nursed.

A description of this method, as devised by Sedgwick and practised by his helpers, is given by C. U. Moore (4). The manipulation is described as consisting of three simple movements.

> First place the balls of the thumb and forefinger on opposite sides of the nipple, just outside of the areolar region, pressing them firmly against the gland itself. (2) Maintaining this pressure, bring the thumb and forefinger back of the base of the nipple. This presses the milk out of the sinus lactiferous and ampulla which forms the beginning of each external duct. (3) Give a slight forward pull to empty these ducts. Stripping or even touching the nipple itself is usually unnecessary. With inverted nipples the ampulla is often 2 cm. dorsal to the external openings of the milk ducts. To compress it, the tips of the thumb and finger must be pressed deep into the areolar pit.

Sedgwick (5) advised the use of manual expression, particularly for stimulation in cases where the milk supply is insufficient for the baby and a complemental feeding made necessary, also the keeping up of the milk supply until infants are strong enough to empty the breasts. Several interesting cases of the reëstablishment of lactation by the use of this method are cited.

Tarr (6) writes of the excellent results obtained from Abt's electric pump. He finds that it develops and reëstablishes milk more easily and promptly than hand expression.

Hodgson (7) suggests the use of hot and cold bathing of the breasts, done by experienced hands. Have two basins of water, one hot and the other cold, and use alternately until the hot water is cold. The breast is then rubbed down with a rough cloth, always from the periphery toward the nipple. This should be practised three times a day between feedings.

The art of emptying the breasts is not a new procedure. Its first extensive use was by E. Truby King of New Zealand. Moore (4) mentions King as being an ardent believer in massage, hot and cold applications, and suction with a breast pump. The psychotherapeutic effect of these on the mother is also of value. King has developed a group of special nurses who are adepts in the art of maintaining or restoring milk secretion through the above mentioned methods. The nurses, scattered

throughout New Zealand and Australia, bear the name of Plunket Nurses, named after a government official who assisted King in developing the so called Mother-Craft homes where his methods are taught. It is interesting, in passing, to note that New Zealand has the lowest infant death rate.

Moore and Dennis (8), discussing breast feeding problems, advise the use of manual expression in cases where the milk supply is insufficient, and also where artificial feeding must be practised for a time, as is sometimes necessary in circumstances where the mother has certain diseases. Moore has published many articles on breast feeding and correlated subjects, and is an ardent advocate of manual expression.

Perhaps the most convincing proofs of the adequacy of manual expression in increasing milk production comes from the several Mother's Milk Bureaus scattered over the country. The Detroit Bureau practises this method of expression almost exclusively, and under such manipulation has seen milk supplies reach unprecedented heights. Over seven quarts in twenty-four hours was obtained in one instance, and four, five and six quarts daily in several others. The demand for manual expression has become so general in Detroit that the Detroit Mother's Milk Bureau has developed a post-graduate course in which registered obstetrical nurses may be given instruction in the art of expression. It is hoped that the knowledge of this method may become wide spread so that mothers with failing milk supplies may be given the benefit of this treatment.

From the above, it would seem that at least one procedure has proven itself efficacious. Manual expression, however, cannot bring results unless the diet of the nursing mother is adequate, and it is on this point that there exists much variation of opinion. The early writers on the subject include many famous names, one of which is that of Voit (9). His conclusions are that milk secretion does not vary proportionally with the ingredients, or the amount of the diet, but is dependent primarily upon mammary development. Ssubotin (10), another early observer, found that the type of diet had an important influence on the composition of the milk; also that a high protein diet increases the total quantity of milk secreted, while a high fat diet decreases it. Ssubotin's work was done on dogs.

Eckles (11) believed that the richness of a cow's milk is fixed by heredity and cannot be permanently changed by any means. Therefore, in ordinary practise, the diet has no influence on the richness of the milk. The part that inheritance plays in the milk secretion of cows is discussed by Gowen (12). His conclusions are that:

The cow's heredity and environment before lactation would be the important factors tending to stabilize the cow's production to a given level. The unstable factors would be those of environment and climatic conditions and changes in food tending to cause variations within the given lactation. . . . . Thus the parents or grandparents may to a large extent portray the relative milk yield or concentration of the milk solids of a given cow as contrasted with other cows.

That the amino acids of the blood are the precursors of milk proteins, is the finding of Cary (13). His conclusion is based on the fact that in a lactating cow the amino acid nitrogen content of the mammary vein is much lower than that of the jugular, while in the non-lactating animal the two are practically the same. Meigs (14) believes that changes in the diet influence the quantity and quality of the amino acids circulating in the blood, and that these affect milk secretion. The intimate relationship between these amino acids and the carbohydrate and fat, as well as the protein in the diet, is shown. These dietary changes affect the protein and fat of milk as well as the total quantity secreted. Lactose content is not noticeably changed.

With regard to the relative food consumption of rats during pregnancy and lactation, Wang (15), also John and Schick (16), found no increase in daily food intake during pregnancy, but a large increase during lactation. John and Schick found that this increase amounted to two and one-half times the normal food consumption.

Banu and Heresco (17) concluded that a carbohydrate diet has no influence on lactation, nor is lactation affected by insulin used by diabetic wet nurses. Diabetes is not a contraindication for nursing. Nitzescu and Nicolau (18) found that insulin injections in sheep had very little effect on milk secretion. Only a slight decrease in lactose was found, even when the blood sugar was greatly diminished.

Nitzescu (19), in his work on the action of intravenous injections of glucose on the milk secretion of sheep, and the origin of lactose, found that the monosaccharides and maltose are source materials for the synthesis of milk sugar by the mammary gland. The quantity of milk and of milk fat is not influenced by glucose injections. According to Watkins (20), the tolerance for lactose during lactation is apparently the same for the nursing mother as it is in normal men and for most women in the intermenstrual period.

Pasch (21) stated that undernutrition, if only moderate, does not produce a diminution in the fat of human milk. His findings agree with those of Volkhase for cows. That undernutrition affects the quantity

of milk, rather than the fat content, is also reported by Kirschner, according to Pasch.

Hartwell, in 1921 (22) and 1922 (23), experimented on rats as to the supposed harmful effects of excessive protein. Diets in which protein made up forty-six per cent of the totals solids fed were used. Although the mothers did not seem to suffer on this diet, it had a disastrous effect on the young, causing spasms and eventually death. It was found that the better the protein fed, the worse were the results, that is, babies of mothers who were given protein in the form of meat or caseinogen developed worse spasms than babies of mothers fed gelatine and gluten. When milk was added to the diet in later experiments, the young were normal and this, it was concluded, was due to the vitamin B content of the milk. Other food stuffs containing this vitamin, such as tomatoes, wheat germ, egg yolk, and yeast preparations, had the same protective action as did milk. Maynard and Bender (24) studied the comparative effects of different planes of protein intake upon female rats with respect to the production of young, lactation, etc. They found that a fifty per cent ration is as effective for reproduction as an eighteen per cent one. Their results cover a period of six lactations. Marked enlargement of the kidneys, and some degeneration, was found in the high protein group. Hitchcock (25) has shown that female rats nursing litters weighed more, and raised larger and better baby rats when they were fed meat in addition to an adequate diet. The rate of growth of new born rats was faster when the mother received meat.

It has been shown that certain facts have been definitely ascertained regarding lactation in animals, but careful scientific work on the production of human milk is singularly lacking in medical literature. This same deficiency was deplored by the writer (26) in an article recording some studies made on diets in mothers. These were patterned after those made by Hart (27) and his coworkers. The findings of the writer are summarized as follows:

1. A nutritive ratio of 1:6, or narrower, seems best adapted to the needs of the nursing mother.

2. Animal protein is more suitable than vegetable in supplying nitrogen for the milk and maintenance of nitrogen balance.

3. The protein derived from nuts, when fed with other vegetable proteins, is suitable for supplying milk protein and for maintaining nitrogen equilibrium.

4. A diet composed exclusively of cereals, fruits and vegetables, does

not supply sufficient protein for elaborating milk protein and causes a severe drain on the tissues of the mother.

5. Of the various forms of animal protein, that derived from cow's milk seems particularly suitable for the production of human milk protein, as well as for the preservation of maternal tissues.

A notable piece of work was done by Adair (28) confirming the value of a relatively high protein intake as essential to the best milk production. High fat and high carbohydrate diets had no stimulating effect on milk secretion. Hospital, high protein, and balanced diets, seemed to meet the needs of mother and infant, without excessive caloric intake, better than either high fat or high carbohydrate diets. A very excellent résumé of the literature is given, and the article is commended to the attention of those interested.

Kleiner, Tritsch and Graves (29) studied the effect of supplementary feeding of carbohydrate and also of fat on lactation. Carbohydrates in the form of tapioca and rice, and fat in the form of cream were used. The hospital diet had a caloric value of about 2600 while the experimental diets were around 3000. The nutritive ratio in the first case was around 1:12 and in the other about 1:14. The most important findings were that the greatest amounts of milk were obtained in the tapioca and rice diets and also the greatest caloric values. These results cover only the time the mothers were in the hospital, usually about eleven days.

Turner (30), of Des Moines, Iowa, suggests that the mother include plenty of raw carrots, celery, cabbage and fruits in her diet, not only for their vitamin content, but also because they tend to increase the milk supply. Morse and Talbot (31) maintain that the mother should eat the same foods while nursing the baby as she did before, eliminating only such foods as do not agree with her. Though a complete emptying of the breasts is the best stimulant to milk secretion, a liberal and generous diet and a normal life are very important. Increasing the quantity of liquid taken increases the quantity of milk up to a certain extent. The quality of the milk, however, is not easily influenced. The amount of fat in the food has very little effect on the amount of fat in the milk, unless the mother is underfed, in which case there will be a temporary increase in the milk fat. The quantity of sugar and protein cannot be directly influenced by diet. Nervousness and excessive fatigue increase protein, but this returns to normal value when these conditions are improved.

Sheffield (32) suggests that the mother have one quart of milk daily,

cereals or toasted bread, in addition to vegetable broths, stewed fruits, a small portion of chicken or lamb for dinner, and an egg for supper, for the first three days, and there after a gradually varied diet so that by the time the patient is out of bed she will be on her accustomed diet. Sansum (33) suggests a diet with sufficient bulky and residue containing foods in order to guard against constipation, ample alkaline foods to prevent acidosis, and enough protein to maintain tissues of the body. Emphasis is placed on exercise and a reduction of fat rather than of carbohydrate, in order to control weight. Plenty of mineral and vitamin rich foods and water are also requirements.

The need of mothers for additional food to make up for the 750 calories lost with the milk, and additional water to replace the quart secreted, is brought out by Moore (34). A common error is to overfeed the mother, especially with a milk diet, thinking that milk poured into the stomach will appear in the mammary glands. The amino acid and vitamin B requirement of the nursing mother is also emphasized. The wet nurse, according to Abt (35), should be served the same kind of food she has been accustomed to eating and do the kind of work she has been accustomed to doing. Often a wet nurse has had her milk supply diminished because of the change in her mode of living. Schoedel (26), in studying influences affecting lactation, finds that an increase in albuminous foods increases the milk secretion. He quotes Rohmann as being undernourishment of the same opinion.

In this day of strict dieting, many mothers, in fear of gaining weight, take too little food. The effect of undernourishment on milk secretion was studied by Momm (37), in mothers whose diets were reduced on account of the Great War. He was unable to find any change in the quality of the mother's milk during the war period, nor was there any definite change in the birth weight of their infants. He found also that as the war period was prolonged the number of nursing mothers decreased amazingly. This decrease was more marked in the winter months than in summer. Another observer of war-time diets was Grumme (38). He states that during the first two and one-half years of the war, mothers were well nourished and did not suffer, but after that there were both fat and protein deficiencies in their milk. An attempt was made to substitute carbohydrate, but many cases of alimentary oedema followed. Due to lack of protein, nitrogen equilibrium could not be maintained, and this resulted in a lowered resistance to infection. The number of mothers unable to nurse their young greatly increased, and while the quality of milk suffered no change, yet the quantity decreased,

often to physiological cessation. Grumme's studies led him to these conclusions: (*a*) During lactation, a mother requires more food, since she nourishes herself and also her child; (*b*) a greater demand necessarily requires a greater quantity of the necessary food stuffs, especially of protein; (*c*) in lieu of the necessary quantity of food stuffs, the health of the mother suffers, and the breasts finally become dry.

STUDIES IN VITAMINS

In recent years the subject of the effect of vitamins on milk secretion has been carefully studied, particularly with laboratory animals. Meigs stated that the evidence, so far, indicated that changes in the vitamin content of the diet influenced directly the concentration of vitamins in the milk rather than the amount of milk secreted.

Kennedy and Dutcher (39), from a study of the diet of cows, concluded that the presence of vitamins in the milk is entirely dependent upon their presence in the diet. That the effect of the vitamin is a stimulation of metabolic processes which promote growth, rather than simply stimulate appetite, is also pointed out.

Vitamin A studies

A study of the vitamin A content of mother's milk was first reported by the writer in collaboration with Macy, Outhouse, Long and Graham (40, 41). This early work showed that human milk contained a fair amount of this vitamin. There was considerable individual variation, but in the several cases studied it was found to be ample to produce growth. Macy has published several articles on the biological properties of mother's and cow's milk.

Vitamin B studies

Sure (42, 43, 44, 45) found that the vitamin B requirement for lactation is about three times that required by normal control animals (rats). This large requirement is explained as due to the inability of the nursing mother to secrete vitamin B quantitatively in the milk. A quantitative method for the study of vitamin B has been worked out by Sure.

The results of studies by Hartwell (46) on the relation between vitamin B and lactation are summarized as follows:

> Thus, in general, we may say that various diets which are excellent for the growing animal may be totally unsuitable for the lactating animal. In the experiments quoted in this paper, with diets rich in protein, the lactating rat

must have a greater supply of vitamin B than in any other stage of her existence, otherwise she cannot rear her young successfully. If this be true of human beings, a mother taking a diet containing but little more protein than the Atwater standard should include in that diet considerable quantities of foods (e.g., fruits and vegetables) containing vitamin B.

The biological property of human milk in its content of vitamin B was first reported by the writer in collaboration with Macy and coworkers. The important fact elicited was that pooled mother's milk was relatively low in this vitamin. Whether the liver of the rat shows variation in vitamin B content, depending on the richness of the diet in that factor, was determined by Osborne and Mendel (47). Their conclusion is that when an adequate supply of vitamin B is lacking in the diet, the store of this factor in the liver tissues, where it is ordinarily found in abundance, becomes largely depleted.

The results of Evans and Burr (48, 49) indicate that when yeast is the source of vitamin B, about five times the usual intake is required during lactation. This additional yeast is necessary because of the antineuritic fraction of vitamin B, and not because of the growth-promoting part. This is demonstrated by the fact that when tikitiki, which is known to be almost lacking in the growth promoting fraction, is used as the source of additional vitamin, normal lactation is produced.

Macy and her coworkers (50) have concluded from the effect of mixed human milk on rats that the vitamin B content is very low, below that of cow's milk. The possibility that many mothers do not supply enough of this vitamin to their babies is suggested, and a supplementary feeding of vitamin B to breast-fed and artificially fed infants early in the nursing period is advised.

Vitamin C studies

Meyer and Nassau (51) repeated Frank's experiments on feeding young guinea pigs with oats and human milk. Though this diet caused death, due to protein deficiency (guinea pig's milk contains three times more protein than human milk), there was no evidence of scurvy. When additional protein was added to this diet, animals thrived, showing that human milk contains sufficient vitamin C for young guinea pigs.

Vitamin D studies

The work of Korenchevsky and Carr (52) shows the beneficial results of a diet rich in the fat soluble factor and calcium, both during pregnancy

and lactation, in protecting the offspring (rats) against the disorders of general nutrition and rachitic changes in the skeleton, produced by a diet deficient in these two materials. Petenyi (53) believes that breast-fed children may develop avitaminotic conditions such as retardation of development in general, and mild forms of anemia. This is due to the deficiency of vitamin D in the milk. The addition of a small amount of vegetable to the food is very effective.

Steenbock (54) and his coworkers have demonstrated that exposure to the radiation of a quartz mercury vapor lamp increases the antirachitic properties of cow's milk eight or more times, and that of goat's, about twenty-four times. Direct irradiation of the animals also produces this effect to a lesser degree. In another paper, Steenbock (55) and his coworkers bring out the point that in milch cows the maintenance of calcium equilibrium is essential for a high and sustained milk flow. The negative balance of cattle exposed to summer sunlight and with a ration made up of calcium containing legumes containing an average lime content, suggests the possibility that, in order to keep the cows up to standard, an adequate supply of the antirachitic factor must be furnished in addition.

The experiments of Hess, Weinstock and Sherman (56) show that the antirachitic properties of human milk are greatly increased by irradiation of the mother. Human milk was fed to rachitic rats with no beneficial effects. Irradiation of the mother treated every other day for a thirty-day period, produced milk which, when fed to the rachitic animals, resulted in marked improvement. The value of ultra-violet radiation to the human lactating mother as a preventive to rickets in the baby is suggested. Irradiation of goats by Henderson and Magee (57) reduced the fecal excretion of calcium, but had a less constant effect on the phosphorus excretion. The probability is, therefore, that irradiation increases calcium storage during pregnancy and diminishes calcium losses during lactation. Ultra-violet radiation is suggested as a valuable aid in minimizing the decrease of mineral reserves in lactating animals. These lowered mineral reserves may affect breeding, milk production, and the susceptibility to tuberculosis.

Vitamin E studies

In 1926, Sure (58) studied the effect, on fertility and lactation of the addition of various vegetable and fruit oils to a basic, (sterility producing) diet of rats. The oils that were effective in curing sterility and permitting normal lactation were: wheat oil, cottonseed, corn, and palm. Peach kernel, soy, peanut, and olive oils, were found to have antisterility

properties, but could not produce normal lactation. Linseed, cocoanut, sesame, palm kernel, rape seed, mustard seed, oil of sweet almond and commercial corn oil, were deficient in antisterility properties. In a succeeding paper, Sure (59) developed further evidence that the reproductive dietary complex which he calls vitamin E, consists of a lactating-promoting as well as an antisterility factor. In wheat oil, experiments indicate that these two factors are fat-soluble and that the antisterility factor is thermostable and the lactation promoting one is thermolabile.

Evans and Burr (60) studied the development of paralysis in suckling young rats whose mothers were deprived of vitamin E. When food containing this factor was added to the mother's diet no paralysis in the young developed.

PHYSIOLOGY AND CHEMISTRY

Certain facts have been elicited by various workers regarding the physiology and chemistry of milk production which may well be given attention by any group that enters on an intensive study of factors in milk production.

Brody, Ragsdale and Turner (61), in 1923, attempted to determine mathematically the rate of decline of milk secretion with the advance of the period of lactation. Their conclusions are quoted.

> It is shown that the course of the decline of milk secretion with the advance of the stage of lactation is constant. This substantiates the idea that milk secretion is limited by a chemical reaction and, in general, brings lactation into the class of processes the speed of which is determined by the concentration of a limiting substance.

A continuation of this work by Brody (62) was published in 1924 to extend the physico-chemical interpretation used to explain the decline of milk secretion, so as to include the first months of the lactation period, during which time the curve of milk secretion rises and passes through a maximum. It was previously thought that the initial rise of milk secretion was due to the improved condition of the animal, and the increasing food consumption due to this improved condition. It was found, however, that the curve of the food consumption and the curve of the milk secretion did not show the expected parallelism, and that the animal became normal before the maximum milk secretion was obtained. This seems to indicate that the factors in the rise and decline in milk secretion are inherent in the productive mechanism. Like the decline in milk secretion, the rise may also be represented by the equation of a monomolecular change. From the two equations, a single one may be obtained

whereby the concentration of the substance or factor, or the intensity of the condition which controls or limits the velocity of the process of milk secretion at any time, can be calculated. This controlling factor may be assumed to be due to the development and decline in the number or vigor of the milk secretory cells, brought about by chemical processes. The authors conclude:

> It seems quite reasonable to consider the process of rise and decline of milk secretion with the advance of the period of lactation as a species of growth and senescence, possessing, however, the unique property of being renewed with every gestation.

Sheffield (63) divides the nursing mothers into three groups: one group that can nurse their babies, and either does or does not do it, to suit her own convenience; another group that cannot, but is anxious to do so; and a third group of mothers who could suckle their infants at least partially, if properly guided by their family physician before and after the birth of the child. The first group is made up mainly of foreign born mothers of small or moderate means in whom the idea of breast feeding is taken as a matter of course. Nutrition and environment seem to have little effect on the milk supply, which is usually plentiful. The second group comprises the so-called intelligentsia, whose very anxiety to feed their infants, together with their hypersensitiveness and their intelligence, defeat their own ends.

Reiss (64) believes that in the prenatal care the mother should be prepared to nurse her baby and should be impressed with the idea that in failing to do so she is robbing her child of its best opportunity for maximum growth and development. The only absolute indications for discontinuing breast feeding are open cases of tuberculosis and extensive suppuration of the breast. Infections and contagious diseases are only temporary causes, and in these cases the breasts should be stimulated artificially until such time as breast feeding may be resumed. Menstruation, fissured and inverted nipples, and the fact that the milk does not agree with the infant, are rarely causes for discontinuing breast feeding. The last three conditions can usually be corrected.

The fact that failure or success of breast feeding may depend on prenatal and postnatal care of the breasts is stressed by Sherrick (65). For the sensitive nipple he advises the open air treatment, exposing the nipple to the air for two hours twice daily. He believes that with the average infant a long and regular nursing interval, rigorously maintained, is essential. A three-hour nursing period for children under

seven pounds and a four-hour period for those over that weight is advised. Night feeding should be discontinued as soon as possible after the first month in order to insure a good night's rest for the mother. According to Richardson (66), many mothers feel that insufficient rest is the cause of diminution of their milk supply. Oftentimes the mother has had sufficient milk in the hospital, but readjustment to her household duties has been arduous for her and results in the loss of her milk.

Carr (67), and also Smith and Merritt (68), have made a series of studies on fractional nursing. It was found that nursing infants obtained the greater part of their feeding in the first few minutes. Forty to sixty per cent is obtained in the first two minutes, and from sixty to eighty-five per cent in the first four minutes. After eight minutes the breast is usually emptied. Prolonged nursing has the disadvantages of wasting the mother's time and causing nervousness.

GENERAL SUGGESTIONS

Gardner (69), in his analysis of human milk, found a variation in the composition of the milk taken at different intervals of the day. Three methods of obtaining representative samples are suggested. (*a*) The ideal way is to collect the entire twenty-four hour secretion and take the sample from that. (*b*) The milk from one breast is expressed and the sample taken from it. In order to determine whether or not the breast has been emptied the average content of the breast should be obtained by weighing the baby before and after nursing for a twenty-four hour period. (*c*) A definite quantity of the milk may be taken before nursing and a like amount after nursing, and the two samples combined. This is necessary since the fat is higher at the end of the nursing period than at the beginning. The best time to take the sample, for most representative results, is between 9 and 10 a.m. From the writer's experience with the Detroit Mother's Milk Bureau, there is such marked variation in quality of milk taken at different times that little reliance should be placed on average samples taken. The only certain way is to use a portion of a twenty-four hour specimen.

Meyer (70) in his series of analyses, gives average values of some of the constituents of human milk as follows: protein 1.8 per cent, fat 3.85 per cent, lactose 6.0 per cent, and the caloric value per ounce, 18.95 calories. The protein and fat may vary within moderately wide limits in normal milk.

Gowen and Tobey (71) studied the relation between the size of the udder and the milk yield. They found that most of the milk (at least

eighty per cent) was present at the time of milking, and that the size of the udder measures closely the amount of milk which the cow is able to secrete.

A questionnaire was sent out by Richardson (66) to nursing mothers asking when they had the most milk and the least. The majority replied that the early morning feeding was the largest and the 10 p.m. the smallest. The fact that a good nursing is likely to occur when the mother is alone with her baby, and that over-feeding is a myth are also brought out here. De Lange (72) states that sensitive children in institutions will react favorably to music. Sheffield (63) suggests that the baby remain in the same room with the mother, as it helps her to take her mind from herself.

Hoefer and Hardy (73) have studied, comparatively, the mental and physical development of breast fed and artificially fed children. On the average, the artificially fed were the most susceptible to the disease of childhood. In mental development the artificially fed ranked next to the lowest, the lowest being those children who were breast fed from ten to twenty months. Children, breast fed from four to nine months, were definitely superior physically and mentally to all other groups.

For many years past, subjective and objective influences have been considered as they affect human milk production. Schoedel (36) made such a study, and concluded that nursing, itself, is the natural method for initiating lactation. He found, however, that subjective symptoms, psychological in character, may vitiate the natural stimulus. For example, an illegitimate mother does not care to nurse her child and consequently her supply is diminished. A mother who is worried about family or financial matters exhibits a decrease in milk production and this worry in spite of all other factors will control the milk flow. Unless worry is eliminated the flow will steadily decrease. He concludes that anything which removes worry, fears, and unpleasant environment, aids in the maintenance of a permanent, effective and sufficient milk supply for the infant.

Among other procedures which some authors have reported as being valuable in bringing back a failing milk supply, one may mention the use of the quartz lamp. There is no unanimity of opinion as the following references will show. Chisholm and McKillop (74), at the Manchester Sun Clinic, attempted to ascertain if ultra violet radiation was of value in increasing the milk supply in nursing mothers whose supply was failing. The women were exposed three times a week, at a distance of one yard from a Hanovia Mercury Vapor lamp. They were given grad-

ually lengthening periods from two minutes to a half hour, according to the reaction of the patient. The treatment was then continued at the latter rate, or reduced to once a week, according to the needs of the patient. The patients were exposed down to the umbilicus and up to the thigh, half the time exposing the front, then turning. Excellent results were obtained.

Drossel (75) made experiments with the quartz lamp, but did not get the good results obtained by other experimenters. He concluded that the exposures were not uniformly effective, as results vary according to race, social standing, legitimacy, and psychological influences. A combination of diathermy and quartz lamp was reported by Ornstein (76). He found this effective in certain cases which did not yield to drugs, pumping, massage or stripping, but acknowledge that stripping the breasts after nursing is often quite effective. He suggested that since diathermy produces congestion of the breasts it would in turn produce an increased milk flow. He placed two cup-shaded poles at the breasts, and a flat plate at the back; a current of two to three amperes was passed through. This was followed by quartz lamp treatments until milk erytherma was produced.

Various organic extracts have been used, including desiccated placenta, placental extracts, corpus luteum, ovarian extracts, thyroid, and adrenal. The many articles published covering the work done are not at all convincing as to the value of these extracts in milk production, although all of them exert an influence as depressors or stimulators of milk secretion. Much needs to be done in this field. Iodine also has its influence, either directly or in connection with one or another of the internal secretory glands, particularly that of the thyroid.

SUMMARY

In this résumé of our present knowledge of factors influencing human milk production, one can definitely state that the method of stripping the breasts after each nursing has been demonstrated to be the best method for maintaining a milk supply, or for increasing a failing one.

A study of the effect of diets indicated that the protein portion of the diet should be maintained at a higher level during lactation than at other times. The ratio for dairy cattle, as established, is one part protein to five or six for fat and carbohydrate (reduced to caloric basis).

There is a general unanimity of opinion that the protein portion should be relatively high.

Three thousand calories per day for a nursing mother seems to be the optimum intake.

Many vitamin studies have been conducted. The general opinion is that all the vitamins play a part in milk production, but that A, B, and E, seem to have a greater influence than C and D. It would be difficult to say from present findings that there is a predominating vitamin which directly influences lactation, but indications are that all known vitamins should be represented in order to make an adequate diet for a nursing mother.

Much of the vitamin work has been done on rats, and it is essential that observations be made on nursing mothers, using the rat experiments as a basis of study.

Certain physiological and chemical observations may well be studied, particularly regarding the emptying of breasts and the fallacy of the average sample of breast milk sent to a laboratory for testing.

Psychological studies are beginning to come into the literature, and it is to be hoped that many old wives' fables may be removed from the category of truths. Certain very definite conclusions may well be made as to the effects of worry and fear on milk production.

Studies reveal that the quartz lamp, according to certain observers, may be made an aid in maintaining a milk supply.

The action of hormones in retarding or stimulating milk flow is the subject of many papers, in itself a proof that this is a difficult question to solve, but one, no doubt, having weighty bearing on the problem of an adequate milk supply.

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NUTRITION SURVEY IN LABRADOR AND NORTHERN NEWFOUNDLAND*

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A nutrition survey among the fisherfolk of Labrador and Northern Newfoundland was the purpose of a trip taken by the writer last summer at the request of Sir Wilfred Grenfell. The plans outlined before leaving were somewhat modified after experience among the people demonstrated that collecting the children for weighing, measuring and physical examination was quite impossible in many localities. Some general idea was obtained, however, from superficial examination and from the nurse in the district, who was usually familiar with the physical condition of the families. Information on dietary habits and food supplies, on the other hand, was available in greater and more accurate detail than I could have believed possible.

In company with a nurse or industrial worker, my calls on these families usually took the form of an informal friendly visit. While there was some reticence shown at first, when we seemed to be prying into their personal affairs, I met with ready coöperation in nearly all cases, after it was explained to them that my purpose in asking so many questions would be for their ultimate benefit. The response varied in different localities in accordance with the attitude which had been created by previous nurses, visitors, and others. Some were suspicious of being subject to ridicule, but I found that tact and sympathy soon obtained their confidence, and the desired information was forthcoming. Thus the data presented in this paper were collected largely from the people themselves, and have subsequently been sorted out and interpreted from a scientific standpoint.

My fifty dietaries were collected from twelve or more different villages of from five to fifty families each, dotted along the rugged coasts of Northern Newfoundland and Southern Labrador. The Grenfell nursing stations were used as headquarters from which the smaller villages were reached by long hikes over rock and through swamp, or occasionally by

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small motor boat when storms or fishing did not prevent. The longer distances between mission stations were made by mail steamers which ran irregularly every ten days or three weeks. This casual life among the Labrador fisherfolk and the uncertain means of transportation, placed a limit to the amount of scientific work which could be accomplished in the brief period of eight weeks spent on the coast.

Aside from fish, game, and a minimum of edible vegetation, all of the food supplies must be obtained from the traders in barter for the season's catch of fish—a far more common medium of exchange than currency. While trading posts in the larger villages make possible the retail purchase of a few supplies, the prevailing custom is to obtain a twelve months' food supply each fall. Thus I found most of the women able to speedily tell me just how many barrels of flour, gallons of molasses, pounds of oleo, etc., her family consumed in a year. It would be rare indeed to find this sort of information so easily available in our communities.

The nurse could usually attest to the reliability of the information obtained, as to whether pride had tended to increase the figures given, or hope of assistance tempted them to make a hard luck story. In general, the representative families chosen from each village were intelligent enough to understand our purpose and to give us as accurate figures as they could remember. The amount of fish saved for winter use, the game (locally known as "fresh") caught, the berries picked, and vegetables raised, had to be calculated to the best of our combined abilities. Such unfamiliar or irregular units of measure as a quintal of fish, a half-bag of hard bread, a gallon of peas, and various sized tubs and barrels, were transposed into the approximate number of pounds after the necessary information had been accumulated. (See table 1.)

Thus it was possible not only to learn what foods were most commonly used, but also to calculate, from the quantitative data collected, the nutritive value of the year's food supply. The sample dietary given is typical of that of most of the families along the section of the Labrador coast visited. The marked similarity in food habits among these fisherfolk of English and Scotch descent is undoubtedly a product of national taste, tradition, and economic necessity. In those settlements where there are few, if any, gardens, no cattle, goats, sheep or hens, the situation is by far the worst. A barrel of white flour per adult per year, molasses, salt pork, salt beef, butterine or oleomargine, a few beans and peas, a good supply of salt codfish, and a generous amount of tea, is the variety provided by most of these families. The more prosperous and thrifty

TABLE 1

An average family dietary in a locality where there are no cattle and but a few small gardens

One year's food supply for family of 4 adults, and 3 children (5, 3, 2 years), calculated as 5½ adults.

FOODS	100 GRAM PORTIONS	PROTEIN	FAT	CARBO-HYDRATE	TOTAL	Fe	Ca	P
		kgm.	*kgm.*	*kgm.*	*calories*	*grams*	*grams*	*grams*
8 bbl. flour, white, 1568 lbs.	7,056	86.8	7.7	515	2,540,160	7.05	141.1	649.1
4 half bags hard bread, 224 lbs.	1,008	9.8	9.2	73.7	427,392	1.51	22.2	102.9
100 lbs. rolled oats	450	7.5	3.3	29.8	181.100	1.71	31	176.5
35 gals. molasses, 525 lbs.	2,362	5.7		163.7	578,038	17.31	498.5	104
150 lbs. sugar	675			67.5	270,000			
60 lbs. oleo	270		25.2		225,000			
12 cans cond. milk, 10.5 lbs	47	0.4	0.4	2.5	15,698	0.03	14.1	11
½ bbl. salt pork, 100 lbs	450	4.7	29.2		281,000	0.59	2.7	48.6
½ bbl. salt beef, 100 lbs.	450	9.0	6.7		97,000	1.35	5.9	97.0
4 quintal fish, 448 lbs	2,016	51.6	0.6		210,000	2.84	54.8	2,580
180 lbs. "fresh" cal. as chicken	810	17.4	2		87,500	2.4	8.8	174
60 lbs. fresh cod	270	4.5	0.1		19,440	0.2	4.9	51.6
½ bbl. berries, 100 lbs.	450	0.6	0.5	4.5	24,300	0.3	13.5	13.5
5 lbs. raisins	22	0.1	0.1	1.7	7,810	0.05	1.4	3.0
4 bbl. potatoes, 600 lbs	2,700	5.9	0.3	49.7	226,800	3.5	37.8	156.6
10 lbs. navy beans	45	1.0	1.1	2.7	15,650	0.3	7.2	21.2
10 lbs. dry peas	45	1.1		2.8	16,110	0.26	3.8	18.0
10 lbs. rice	45	0.4		3.5	15,910	0.04	0.4	4.3
Total for family for year		206.5	86.4	917.1	5,238,908	39.44	848.1	4,211.3
		grams	*grams*	*grams*				
Total for family for day		571	236	2,510	14,340	0.108	2.32	11.55
Total for person per day		104	43	457	2,610	0.019	0.42	2.1

ones may buy or raise potatoes, turnips and cabbage, but frequently only enough to last for a small fraction of the winter. To be sure, there are many snags in the path of the would-be agriculturist in this swampy, rocky country of short growing season, but trained agriculturists are now studying the soil and climatic conditions, advising what crops will mature best and withstand the early frost, what fertilizer materials can be obtained locally, and how to use them. Professor F. C. Sears of Massachusetts Agricultural College is soon to publish a leaflet on "Gardens for Labrador." Better gardens would seem to be one of the greatest hopes for the future health of these people. In some localities cows or goats provide a welcome and much needed milk supply, but in the less prosperous districts even canned or dried milk is a luxury enjoyed by but few. Sweetened condensed milk is sometimes a luxurious substitute for molasses as "sweetness" in their tea on Sunday mornings, a dozen cans often supplying a family for a whole year.

A study of the nutritive balance of the year's food supply showed but few families with an apparent shortage of total calories. The protein, fat and carbohydrate were in reasonable proportion, starches predominating over sugars due to the extensive use of white flour. The nutritive shortages were chiefly evident among the minerals and vitamins. Phosphorus was usually adequate, due to the large consumption of fish and flour, but the calcium was extremely low for the same reason, thus throwing the calcium-phosphorus balance so far off as theoretically to predispose every child on such a diet to serious bone and teeth defects. In those families where practically no milk was used the calcium allowance per adult per day ranged from 0.2 to 0.5 gram with a Ca:P ratio varying from 1:2 to 1:5. Children eating smaller quantities of the same food received less calcium and phosphate in absolute amounts, but in the same ratio, whereas an ideal ratio for calcium retention during growth is 2:1 or thereabouts. No wonder that many of the children showed jaws full of hopelessly decayed and broken teeth. To be sure, there may also be low resistance to dental caries due to general malnutrition.

Iron was surprisingly adequate in many cases, due to the meat and large quantities of molasses consumed, but fell below the standard allowance level of 15 mgm. per day, when sugar was substituted for molasses—a common practice paralleling a degree of prosperity. Several of the housewives were apologetic when they mentioned this change, and were inclined to discourage the diminishing use of molasses.

The vitamin content of the usual food supply was extremely low,

judged by our present American standards and substantiated by the specific diseases encountered. The surprising fact is that there is not more striking clinical evidence of disease. There does exist, however, an ill-defined lack of "pep" and ambition, chronic under-nutrition, and a low resistance to various diseases such as tuberculosis, all of which may be due to the poor food eaten. Vitamins A and D are adequate in only a few cases where cod-liver oil and cod livers are habitually consumed, but this is not a universal custom by any means. The B and C content of the diet is difficult to calculate because the vitamins of several of the native foods, such as berries, baked-apples, fresh fish, game and seal meat, are not definitely known; there may be sufficient of these two factors to prevent more extreme deficiences. One may facetiously remark that there seems to be no lack of the reproductive factor E in this country.

The results obtained, so far, suggest a definite correlation between the malnutrition and deficiency diseases recognized clinically, and the nutritive value of the food consumed as measured by accepted standards. The widespread occurrence of night-blindness (1), beriberi (2), rickets, mild scurvy, and general under-nutrition, have long been recognized, but still exist and furnish a ripe field for the efforts of a nutritionist. Beriberi shows up during the early spring and is not found in the active stage during the summer months when a more varied food supply is available. In confirmation of an old theory that a vitamin A deficiency bears a etiological relation to night blindness, several such cases discovered by W. R. Aykroyd last summer were relieved in a few days by the administration of cod-liver oil. For the low resistance to tuberculosis, the blame may again be placed partially on poor nutrition shared, however, by poor housing and sanitation. In frame houses of from two to four rooms, with windows sealed shut, four or more persons may sleep in one small room with no ventilation except for the cracks, which are not uncommon in these unplastered and poorly built structures. No toilet facilities are provided in any of the homes, and sewage disposal is most haphazard. Water supplies are usually running streams, rarely wells, of irregular purity with no protection from the scores of dogs. Foods are also handled in a most unsanitary manner, giving every opportunity for the spread of any infection.

One other condition which should be mentioned is the almost universal complaint of constipation, which is undoubtedly due partially to the concentrated nature of the food consumed. When visiting these homes with a nurse, one of the commonest requests is for "opening medicine,"

pills being the only type of remedy in which they have any faith. After the successful introduction of bran bread into the dietary of one family, I was greeted the following week with the good news that two members of the family had not needed their "working pills" that week.

In anticipation of the nutritive requirements of the people, corrective foods such as milk, whole cereals, bran, orange juice, and some other products rich in the various vitamins needed, were donated by several commercial organizations to assist in the nutrition project which was being undertaken.[1] The foods were distributed among several Grenfell Mission Stations to be used for families where definite states of malnutrition or deficiency disease existed. The families were carefully selected after visiting them in company with the nurse and obtaining as complete a history as possible. During the winter these foods have been apportioned to the various families at the discretion of the nurse, who is also checking up on the height and weight of the children and general physical conditions. Any family failing to coöperate in our project will have its supply discontinued, but the article or articles of food being furnished are enough of a luxury to them in most cases to hold them to our agreement.

A well trained nutritionist, under the writer's supervision, is going north this summer to continue this nutrition project for a whole year by conducting more intensive educational work in one locality in Northern Newfoundland. Her first problem will be to inspire the people with the desire and possibility of improving their physical conditions, and then to teach by simple talks and demonstrations. Thus her friendly, genial personality, linked with good common sense, sociological and home economics training and experience, will combine to serve these people and teach them the rudiments of better sanitation, economics and a balanced food supply. She will also visit most of the villages touched last summer,

[1] The expenses of this project and its continuation are being defrayed by the generous gift of three New York City friends of the Grenfell Mission work. The International Grenfell Association and I personally wish to express our thanks to the following companies who generously contributed to the success of our project. Evaporated Milk Association, Chicago, Illinois; The Best Foods Company, Chicago, Illinois; Quaker Oats Company, Chicago, Illinois; Wheatsworth, Inc., New York, N. Y.; W. K. Kellogg Company, Battle Creek, Mich.; Battle Creek Food Co., Battle Creek, Mich.; Dry Milk Company, New York, N. Y.; Merrell-Soule Company, Inc., New York, N. Y.; California Prune and Apricot Growers Association; San Jose, California; California Fruit Growers Association, New York, N. Y.; Ball Brothers, Muncie, Indiana; Sanitarium Equipment Company; Battle Creek, Mich.; National Dairy Council, Chicago, Illinois; Metropolitan Life Insurance Co., Ottawa, Canada.

and, in general, try to check up on the use made of the food supplies furnished, and on the condition of the families under observation.

Thus it is hoped that this dietary study is only the beginning of a more extensive nutrition project, the outcome of which may be reported in the JOURNAL at a future date.

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THE PERCENTAGE COMPOSITION OF COOKED FOOD MIXTURES: CAKES

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Due to the lack of data on the percentage composition of cooked mixtures, such as cakes and simple desserts, foods for carefully filled diet prescriptions have been selected from such simple dishes as steamed vegetables, broiled meats, and fresh or cooked fruits. There are conditions in which this seems to be unavoidable, as in diabetes; there are others in which an accurate dietary record is desirable, but where more leniency is possible in the selection of mixtures when figures for calculating them are available. The objection to using figures for these, such as are given in Bulletin No. 28 of the U. S. Dept. of Agriculture, is that the food value of the product will vary with the proportion of ingredients used in preparation and with the condition of the product when served.

There are two ways of securing figures for these mixtures: the first by calculating the food value of the recipe, and the second by analyzing samples of each food as served. The latter procedure is justified where careful research work is being done, but it is too cumbersome and time-consuming to be practical for daily use. The value of figures obtained by calculation depends first on their being in usable form, and second, upon their being accurate as shown by comparison with analyses made of samples.

Locke (1), in preparing tables of food values, included figures for certain recipes. He listed ingredients in the recipes in terms of measure. On this basis he figured the protein, fat, carbohydrate, and total calories of each serving. It is to be regretted that he did not specify the weights, as well as measures, of the ingredients used in calculating the recipes. One has to assume that the weight of one serving, as he gives it, is a fraction, and not the whole of the recipe, and that the total number of portions that could be served from the quantity prepared was known to the person compiling the information. Otherwise it would be difficult to explain how he could arrive at his estimate of a standard portion and the food value per serving as stated. The directions for preparing and standards for cooking are not specified.

Rose (2) weighed the ingredients in a considerable number of recipes for which she had measures, figured the food value of the recipe in terms of calories and on the basis of standard portions of one hundred calories each, approximated the calories of protein, fat and carbohydrate per serving. The number of servings per recipe was not specified, but the total weight of the cooked product was given in ounces. The failure to outline the conditions under which these recipes were prepared makes it impracticable to reproduce them. Variations in the amounts of liquids and condiments used in preparing, and changes in the temperature and time of cooking, would easily permit of a per cent of error higher than the average allowed in dietary calculations.

Cooper, Barber and Mitchell (3) have published recently a number of interesting recipes. No attempt to reproduce these products has been made in this study. Here as before, however, the unit given for servings is the average standard portion. Such a unit is awkward to use in diet service because it allows little flexibility in the size of the portion that is to be served; that is, if the recipe is calculated on the basis of three portions, it is convenient only to give each patient one-third, or an exact multiple of one-third, of the entire amount, whereas the diet prescriptions for the three patients may vary considerably in the total grams of protein, fat and carbohydrate which they are allowed. Other divisions, such as giving one patient one-third, and another one-fifth, of the entire recipe, complicate the calculations hopelessly when this basis is used. The one-hundred gram portion as a base, alleviates this difficulty by providing a unit that is flexible, thus making it possible to use the food in varying amounts for each patient with simple calculations and accurate results.

A group of recipes, prepared under the supervision of one of the present authors (4), was published by the California State Dietetic Association in 1926. These recipes were calculated on the basis of the one-hundred gram portion. The total amount of protein, fat and carbohydrate in the raw materials was found by using the average per cent for edible portion as given in Bulletin No. 28 (5). This total, divided by the weight of the whole cooked product, gave the per cent, per one-hundred grams. The methods for preparing these recipes were standardized so as to insure a uniformly good product as well as one consistent in total weight. Repeated trials by many people whose experience in cooking varied from none to many years, demonstrated the feasibility of controlling the procedure to the point of being able to reproduce at will a standard product of satisfactorily uniform weight.

It was recognized, however, that proof of the exactness of these figures could be obtained only by reproducing and analyzing samples under a given set of conditions. The experimental work reported here was undertaken to determine the limits of error of figures calculated according to this plan. This study has been limited to six recipes, in the planning of which no claim to originality is made. Such changes were made in the original directions, both in amounts of ingredients and in preparation, as were found necessary to produce a product of high quality. Following are given exact copies of the complete recipes, including baking directions.

Plain angel food

MATERIALS	MEASURE	WEIGHT, GMS.	PROT.	FAT	CARBO.
Egg white	1½ c. (scant)	350	43.05	0.70	0.00
Sugar, fruit	1½ c.	300	0.00	0.00	300.00
Flour, cake	1 c.	100	7.58	0.80	78.23
Cream of tartar	1½ tsp.	4.68	0.00	0.00	0.00
Salt	1.4 tsp.	1.01	0.00	0.00	0.00
Vanilla	1 tsp.		0.00	0.00	0.00
Totals			50.63	1.50	378.23

Temperature, 330–340 degrees F. Time, 1 hour. Baking pan, aluminum angel cake pan. Capacity, 3950 cc. of water. Depth, inside 4.00 inches; diameter outside, bottom 8.5 inches, top 10.0 inches.

Directions for mixing: Weigh flour and sift six to ten times. Sift sugar once before weighing to remove hard lumps. Add salt to egg whites and beat (preferably with a whisk) until foamy; add cream of tartar slowly, and continue beating until whites will stand to a point. Fold in sugar, add vanilla, then fold in flour carefully and in small fractions. Pour into ungreased angel-cake pan, cut through batter with spatula to remove air bubbles and bake as directed. Invert pan immediately upon removal from oven and let stand (1 to 2 hours before removing from pan) to cool.

Chocolate angel food

MATERIALS	MEASURE	WEIGHT, GMS.	PROT.	FAT	CARBO.
Egg white	1½ c. (scant)	350	43.05	0.70	0.00
Sugar (fruit)	1½ c.	300	0.00	0.00	300.00
Flour, cake	1 c.	90	6.82	0.72	70.40
Cocoa	4 tsp.	10.0	2.16	2.89	3.77
Cream of tartar	1½ tsp.	4.68	0.00	0.00	0.00
Salt	¼ tsp.	1.01	0.00	0.00	0.00
Vanilla	1 tsp.		0.00	0.00	0.00
Totals			52.03	4.31	374.17

Temperature, 330–340 degrees F. Time, 1 hour. Baking pan, aluminum angel cake pan. Capacity, 3950 cc. of water. Depth, outside 4.00 inches; diameter outside, bottom 8.5 inches; top 10.0 inches.

Directions for mixing: Weigh flour and cocoa and mix and sift together six to ten times. Sift sugar once before weighing to remove hard lumps. Add salt to egg whites and beat (preferably with a whisk) until foamy; add cream of tartar slowly and continue beating until whites will stand to a point. Fold in sugar, add vanilla, then fold in flour carefully and in small fractions. Pour into ungreased angel-cake pan, cut through batter with spatula to remove air bubbles and bake as directed. Invert pan immediately upon removal from oven and let stand (1 to 2 hours) to cool.

Sunshine cake (syrup)

MATERIALS	MEASURE	WEIGHT, GMS.	PROT.	FAT	CARBO.
Sugar, fruit	1½ c.	300	00.00	00.00	300.00
Eggs	6 (1¼c.)	300	40.20	31.50	00.00
Flour, cake	1 c.	100	7.58	0.80	78.23
Water	½ c.	120	0.00	0.00	00.00
Cream of tartar	1 tsp.	3.12	0.00	0.00	0.00
Lemon extract	1 tsp.		0.00	0.00	0.00
Salt	¼ tsp.	1.01	0.00	0.00	0.00
Totals			47.78	32.30	378.23

Temperature, 330 degrees F. Time, 1 hour. Baking pan, aluminum angel cake pan. Capacity, 3950 cc. of water. Depth, inside 4.00 inches; diameter, outside, bottom 8.5 inches, top 10.0 inches.

Directions for mixing: Weigh flour, measure cream of tartar, and mix and sift together six to ten times. Make syrup of sugar and water by stirring until dissolved, and boiling slowly until it threads (116 degrees C.). Steam down crystals as they appear on sides of the pan by covering for a few minutes. Add salt to egg whites, and beat until they form a peak. Add hot syrup to egg whites while beating constantly. Continue beating for two minutes. Add egg yolks beaten until thick and lemon colored, to the syrup and egg white mixture. Add flavoring to this. Fold in flour carefully and in small fractions. Pour into ungreased tubed pan, cut through batter with a spatula to remove air bubbles and bake as directed. Invert pan immediately upon removing from oven and let stand (1 to 2 hours) to cool.

Caramel cake

MATERIALS	MEASURE	WEIGHT, GMS.	PROT.	FAT	CARBO.
Sugar, fruit	1¼ c.	250	00.00	00.00	250.00
Butter	⅔ c.	90	0.90	72.90	00.00
Milk	½ c.	120	3.96	4.80	6.00
Flour, cake	1¾ c.	175	13.27	1.40	136.90
Eggs	2	100	13.40	10.50	0.00
Baking powder (double action)	2½ tsp.	7.5	0.00	0.00	2.25
Almond extract	¼ tsp.	0.0	0.00	0.00	0.00
Water	½ c.				
Totals			31.53	89.60	395.15

Temperature, 380 degrees F. Time, 25 minutes. Baking pan, aluminum pan with volume of 105.9 cubic inches. Depth outside 1.1875 inches; width, outside bottom 7.25 inches; top 8.25 inches; length outside, bottom 11.00 inches, top 12.00 inches.

Directions for mixing: Weigh flour, measure baking powder, and mix and sift together three times. Caramelize one half of the sugar, until gold brown (115 degrees C.). Add one half cup of water to the caramelized sugar and cook until it threads (110 degrees C.). Cool and add milk. Cream the butter, and gradually add the remaining sugar. Beat egg yolks until thick and lemon colored and add to the butter and sugar mixture. Add the sirup mixture and flour alternately to the batter. Add flavoring. Fold in the egg whites which have been beaten to a point. Pour into lightly greased pan, cut through batter with a spatula to remove air bubbles and bake as directed. Remove from pan immediately on taking from the oven.

White butter cake

MATERIALS	MEASURE	WEIGHT, GMS.	PROT.	FAT	CARBO.
Sugar, fruit	1 c.	200.0	0.00	0.00	200.00
Butter	⅔ c.	90.0	0.90	72.90	00.00
Milk, whole	½ c.	120.0	3.96	4.80	6.00
Egg whites	3 (⅓ c.)	90.0	11.07	0.18	0.00
Flour, cake	1½ c.	150.0	11.37	1.20	117.34
Baking powder (double action)	2½ tsp.	7.5	00.00	0.00	2.25
Vanilla	½ tsp.				
Totals			27.30	79.08	325.59

Temperature, 380 degrees F. Time, 25 minutes. Baking pan, aluminum pan with volume of 1700 cubic centimeters. Depth outside 1.1875 inches; width, outside bottom 7.25 inches; top 8.25 inches; length outside, bottom 11.00 inches, top 12.00 inches.

Directions for mixing: Weigh flour and measure baking powder, and mix and sift together three times Cream the butter, add the sugar gradually, and cream the two together until light and fluffy. Add the milk, and the flour mixture, alternately, and in small fractions. (Beat after each addition until smooth.) Add vanilla, then fold in egg whites which have been beaten to a peak. Pour into lightly greased pan, cut through batter with a spatula to remove air bubbles. Bake as directed. Remove from pan immediately on taking from oven.

Chocolate fudge cake

MATERIALS	MEASURE	WEIGHT, GMS.	PROT.	FAT	CARBO.
Sugar, fruit	1 c.	200	00.00	00.00	200.00
Butter	1 c.	225	2.25	182.25	00.00
Eggs	3 (⅝ c.)	150	20.10	15.75	00.00
Flour, cake	2 c.	200	15.16	1.60	156.46
Milk (whole)	½ c.	120	3.96	4.80	6.00
Bitter chocolate	2 sq.	60	7.74	29.22	18.18
Baking powder (double action)	2½ tsp.	7.5	0.00	0.00	2.25
Vanilla	½ tsp.				
Totals			49.21	233.62	382.89

Temperature, 350 degrees F. Time, 50 minutes. Baking pan, aluminum tubed cake pan, capacity 2000 cc. of water; bottom, 6.625 inches outside diameter; top, outside, 9.000 inches; depth, inside, 3.000 inches.

Directions for mixing: Weigh flour and measure baking powder, and mix and sift together three times. Cream butter and add sugar gradually, while beating constantly; then add yolks of eggs, beaten until thick and lemon colored. Add flour and baking powder mixture alternately with milk to first mixture. Then fold in whites of eggs beaten to a point, add chocolate melted over hot water and cooled, then vanilla. Pour into greased tubed pan, cut through batter with a spatula to remove air bubbles, and bake as directed. Remove from pan immediately on taking from oven.

TABLE 1

Measures and equivalent weight in grams and percentage composition of specific products used in cakes

FOOD	MEASURE	GMS.	PERCENTAGE COMP.		
			Prot.	Fat	Carbo.
Butter, commercial (1)	1 c.	225.0	1.0	81.0	
Chocolate, Baker's bitter	1 sq.	30.0	12.9	48.7	30.3
Cocoa, Baker's bitter (2)	1 tsp.	2.5	21.6	28.9	37.7
Eggs, commercial unbeaten					
Whole (5 med. sized)	1 c.	250.0	13.4	10.5	
Yolks (14 med. sized)	1 c.	250.0	15.7	33.3	
Whites (8 med. sized)	1 c.	250.0	12.3	0.2	
Flour, Swansdown (3)	1 c.	100.0	7.58	0.8	78.23
Almond extract (Crescent)	1 tsp.				
Vanilla (Crescent)	1 tsp.				
Lemon juice (2)	1 tsp.	5.0			2.3
Baking powder (Crescent) (4)	1 tsp.	3.0			30.0
Cream of tartar (Crescent)	1 tsp.	3.1			
Whole milk, commercial	1 c.	240.0	3.3	4.0	5.0
Sugar, fine granulated	1 c.	200.0			100.0

1. United States Department of Agriculture, Bureau of Home Economics, unpublished material, 1928.

2. Denton, Minna C.: Unpublished material, George Washington University, Washington, D. C.

3. Educational Department, Ingleheart Brothers, Inc., *The Swansdown Cake Manual.*

4. Crescent Manufacturing Company, unpublished material, Seattle, Washington.

Note: The figures for percentage composition, unless otherwise specified, were taken from Bulletin No. 28.

EXPERIMENTAL

The cake samples were prepared and calculated as described above with the following alterations: the percentages used in determining the food value of the eggs, represent cooked eggs (5); other figures were taken from various sources, as indicated in table 1, and represent the edible portion of the raw material. The weight of the total product was determined as follows: the cakes were cooled from one to five hours, depending upon the thickness of the loaf and the convenience of the opera-

tor; the angel food and sponge cakes were weighed before removing from the pan; the butter cakes were weighed after removing from the pan; crumbs in the latter instance were painstakingly caught on sheets of clean paper and included in the weight of the cake. Having calculated the total grams of protein, fat and carbohydrate in the raw product used in the recipe, and the weight of the cooked cooled cake, the percentage composition was found by dividing each total by the weight, as:

	PROT.	FAT	CARBO.
Total weight of cooked cake 631.00 gms.	50.63	1.50	378.23
100.00 gms. (cooked cake)	8.02	0.24	59.94

The sample was prepared by taking from one-fourth to one-third of the entire cooled cake described above. This was broken into small pieces and weighed on a shallow tared pan. The pieces were allowed to dry in a warm airy room for ten days to two weeks, or until two successive daily weighings checked. The samples were then ground in a mor-

TABLE 2

Plain angel food cakes

CAKE NUMBER	COOKED WEIGHT	GMS. PER ONE HUNDRED					BAKING	
		Prot.	Fat	Carbo.	Ash	Moisture	Temperature	Minutes
By calculation								
							°F.	
1	631.0	8.02	0.24	59.94			350	60
2	604.0	8.38	0.25	62.61			320	67
3	641.2	7.90	0.23	58.99			320	65
4	618.6	8.19	0.23	61.14			340	64
5	615.9	8.22	0.24	61.41			330	60
6	610.7	8.29	0.25	61.93			340	60
Average...	620.2	8.16	0.24	60.98			333.3	62.7
By analysis								
1		8.59		59.51	0.60	31.08		
2		9.14		57.89	0.58	32.16		
3		7.72		59.22	0.61	32.23		
4		7.58		61.27	0.66	30.26		
5		7.67		61.52	0.69	29.88		
6		7.74		63.05	0.69	28.28		
Average...		8.07		60.41	0.64	30.65		

tar and a known amount stored in weighed glass beakers covered with watch glasses.

The nitrogen was determined by the boric acid modification of the Kjeldahl method (6). The factor, 6.25, was used for converting nitrogen thus determined into protein. The Polenske-Grujic method, as outlined by Leach (7), was used for the determination of fat. The ashing was done in a muffle furnace. The moisture was determined in the following manner: approximately three grams of the air-dry sample was

TABLE 3

Chocolate angel food cakes

CAKE NUMBER	COOKED WEIGHT	GMS. PER ONE HUNDRED					BAKING	
		Prot.	Fat	Carbo.	Ash	Moisture	Temperature	Minutes
By calculation								
							°F.	
1	652.8	7.97	0.65	57.32			350	60
2	664.4	7.83	0.63	56.32			330	60
3	657.8	7.91	0.64	56.89			330	60
4	673.2	7.73	0.63	55.58			330	60
5	667.6	7.79	0.63	56.05			330	60
6	658.7	7.90	0.64	56.81			340	64
Average...	662.4	7.86	0.64	56.50			335	60.6
By analysis								
1		8.88		60.76	0.65	29.06		
2		8.23		54.85	0.61	35.68		
3		9.61		53.75	0.58	35.42		
4		9.65		51.06	0.60	38.07		
5		9.57		52.21	0.70	36.90		
6		7.90		55.30	0.66	35.14		
Average...		8.97		54.67	0.63	35.05		

weighed, placed in an automatic electric oven at a temperature ranging from 85 to 100 degrees centigrade, and dried for twelve hours; this was then cooled, weighed, and put back into the oven for one hour, and again cooled and weighed. The one-hour periods were repeated until satisfactory checks were obtained. The total moisture represents the loss in weight during air-drying, plus the loss in the oven. The carbohydrate represents the difference of the sum of the protein, fat, ash, and moisture, and one hundred grams. Tables 2 to 8, give the figures obtained by analysis and by calculation, and also a summary for all figures.

TABLE 4

Sunshine cakes

CAKE NUMBER	COOKED WEIGHT	GMS. PER ONE HUNDRED					BAKING	
		Prot.	Fat	Carbo.	Ash	Moisture	Temperature	Minutes
By calculation								
							°F.	
1	623.7	7.73	5.96	60.68			330	60
2	623.3	7.72	5.96	60.64			330	60
3	610.5	7.89	6.08	61.95			330	71
4	637.7	7.49	5.07	59.31			330	60
5	629.3	7.59	5.13	60.10			330	60
6	625.1	7.64	5.17	60.50			330	60
Average...	624.9	7.68	5.57	60.53			330	62
By analysis								
1		7.93	4.34	60.17	0.74	26.82		
2		8.20	4.09	58.45	0.71	28.55		
3		7.90	3.96	59.23	0.69	28.22		
4		8.42	3.85	56.94	0.93	29.86		
5		8.31	3.85	58.18	0.75	28.91		
6		8.52	3.78	59.25	0.76	27.69		
Average...		8.21	3.98	58.70	0.76	28.34		

TABLE 5

Caramel cakes

CAKE NUMBER	COOKED WEIGHT	GMS. PER ONE HUNDRED					BAKING	
		Prot.	Fat	Carbo.	Ash	Moisture	Temperature	Minutes
By calculation								
							°F.	
1	690.0	4.57	12.99	57.25			380	25
2	667.4	4.72	13.43	59.21			380	30
3	670.1	4.71	13.37	58.98			380	30
4	680.7	4.63	13.16	58.06			380	25
5	677.3	4.66	13.23	58.35			380	25
6	698.3	4.52	12.83	56.46			380	25
Average...	680.6	4.62	13.17	58.05			380	25
By analysis								
1		5.34	12.37	55.01	0.67	26.61		
2		4.54	12.68	58.43	0.51	23.84		
3		4.71	13.09	58.42	0.47	23.41		
4		4.70	12.88	57.43	0.54	24.45		
5		4.80	11.24	59.26	0.92	23.78		
6		5.02	12.53	57.71	0.60	24.14		
Average...		4.85	12.47	57.71	0.62	24.37		

TABLE 6

White butter cakes

CAKE NUMBER	COOKED WEIGHT	GMS. PER ONE HUNDRED					BAKING	
		Prot.	Fat	Carbo.	Ash	Moisture	Temperature	Minutes
By calculation								
							°F.	
1	573.9	4.76	13.78	56.73			380	25
2	575.9	4.74	13.73	56.54			380	25
3	573.5	4.76	13.79	56.77			380	25
4	565.3	4.83	13.99	57.59			380	31
5	586.5	4.66	13.49	55.52			380	25
6	587.5	4.65	13.46	55.43			380	25
Average...	576.9	4.73	13.61	56.43			380	26
By analysis								
1		5.22	11.24	59.17	0.49	23.88		
2		5.77	12.97	55.62	0.46	25.18		
3		5.20	13.06	57.22	0.45	24.07		
4		5.21	12.42	57.43	0.48	24.50		
5		5.15	12.31	55.40	0.44	26.70		
6		5.53	11.85	55.80	0.44	26.38		
Average...		5.35	12.31	56.77	0.46	25.12		

TABLE 7

Chocolate fudge cakes

CAKE NUMBER	COOKED WEIGHT	GMS. PER ONE HUNDRED					BAKING	
		Prot.	Fat	Carbo.	Ash	Moisture	Temperature	Minutes
By calculation								
							°F.	
1	886.3	5.55	26.46	43.20			350	50
2	883.3	5.57	26.45	43.35			350	60
3	882.2	5.58	26.48	43.40			350	60
4	889.0	5.54	26.28	43.07			350	55
5	869.4	5.66	26.87	44.04			350	55
6	880.5	5.59	26.53	43.49			350	55
Average...	881.8	5.58	26.51	43.43			350	55
By analysis								
1		5.68	26.33	43.97	0.73	23.29		
2		5.74	26.73	45.11	0.78	21.64		
3		5.97	25.30	43.98	0.74	24.01		
4		5.79	25.28	43.72	0.97	24.24		
5		5.94	25.08	45.96	1.14	21.88		
6		5.78	25.49	44.47	1.11	23.15		
Average...		5.82	25.70	44.54	0.91	23.04		

TABLE 8

Summary of average figures for each cake

	GMS. PER ONE HUNDRED			GMS. PER SERVING
	Prot.	Fat	Carbo.	
Plain angel food:				
By analysis	8.07	*	60.41	30
By calculation	8.16	0.24	60.98	
Difference	0.09		0.57	
Error per serving	0.03		0.17	
Per cent of error	1.1		0.9	
Chocolate angel food:				
By analysis	8.97	*	54.67	30
By calculation	7.86	0.64	56.50	
Difference	1.11		1.83	
Error per serving	0.33		0.55	
Per cent of error	12.3		3.3	
Sunshine cake:				
By analysis	8.21	3.98	58.70	30
By calculation	7.68	5.57	60.53	
Difference	0.53	1.59	1.83	
Error per serving	0.16	0.48	0.55	
Per cent of error	6.4	39.9	3.1	
Caramel cake:				
By analysis	4.85	12.47	57.71	50
By calculation	4.62	13.17	58.05	
Difference	0.23	0.70	0.34	
Error per serving	0.12	0.35	0.17	
Per cent of error	4.8	5.6	0.6	
White butter cake:				
By analysis	5.35	12.31	56.77	50
By calculation	4.73	13.61	56.43	
Difference	0.62	1.30	−0.34	
Error per serving	0.31	0.65	−0.17	
Per cent of error	11.50	10.5	−0.6	
Chocolate fudge cake:				
By analysis	5.82	25.70	44.54	50
By calculation	5.58	26.51	43.43	
Difference	0.24	0.81	−1.11	
Error per serving	0.12	0.41	−0.56	
Per cent of error	4.2	3.1	−2.4	

* Not made.

DISCUSSION

A satisfactorily accurate and practical procedure for preparing cooked food mixtures such as cakes, so that the percentage composition may be approximated by calculating the food value of the ingredients used, has been described. This procedure has been shown by analysis to be accurate, within the usually accepted error for all foods, for the recipes tested.

The equipment necessary to carry out this procedure is available to any diet kitchen, nutrition laboratory, or home, at a reasonable cost.

The technique is simple and may be mastered with ease by the intelligent, careful technician.

The average percentages of error found in the calculations, as against the analysis for the six recipes, range from plus to minus as follows:

PROT.		FAT		CARBO.	
Plus	Minus	Plus	Minus	Plus	Minus
1.1	7.84	14.8		2.0	1.5

The error ordinarily estimated as unavoidable in using average figures for all foods is twenty per cent (plus or minus ten per cent). The grams deviations in the calculations from the average found, per serving, are as follows:

PROT., GMS.		FAT, GMS.		CARBO., GMS.	
Plus	Minus	Plus	Minus	Plus	Minus
0.03	0.33	0.65	0.00	0.55	0.56

The figures for Sunshine Cakes illustrate a point of special interest to therapeutic dietitians. Here the per cent of error for fat is 39.9 and for carbohydrates 3.1, but on the basis of weight, the error in diet calculation per serving would be 0.48 gram too high in fat, and 0.55 gram too high in carbohydrate.

CONCLUSIONS

Our conclusions are: that it is practical in any modern diet kitchen, nutrition laboratory, or home, to standardize the preparation of recipes for certain cakes so that the average percentage composition calculated for them represents no greater error than that allowed for all foods in dietary studies and calculations; that a higher than usual quality in production is maintained by such standardization; that it is no longer neces-

sary either to deprive patients of these foods, or to report on diet charts extremely crude estimates of the nutritive value of the foods consumed.

Analogous work should be carried out for other types of mixtures before conclusions are drawn as to the accuracy of calculations for those not specifically dealt with in this report.

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FITTING THE DIET TO THE FAMILY

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Beginning at the juncture at which the patient leaves the hospital with the diet prescribed for him, granted a coöperative patient, an intelligent and understanding wife or mother, and an income sufficient to meet special diet costs, doctor and dietitian can safely rely on the patient's following out instructions. When these favorable conditions do not exist, however, what happens to the diet after the patient closes the clinic door behind him and returns home?

In the Slater family eight year old Edward was a diabetic. Mr. Slater was never able to earn more than twenty dollars a week, and was for a time unable to work at all because of a foot injury. Our visitor asked my advice on the case in deciding how large a weekly allowance was needed to cover the family expenditures, and in particular the amount needed for Edward's diet. Mrs. Slater, by dint of rigid economies and actual sacrifices had followed Edward's diet to the letter, but with the most careful management she had not been able to provide this diet for less than six dollars a week. At all costs, however, Edward had always had fresh peas, even though they cost fifty cents a pound, and heavy cream, even though there was not enough money left to buy sufficient milk for the other children. Edward was smaller and thinner than the other boys of his age, and because of this could not compete with them in their games, but at home, at least, he achieved distinction. Mother prepared food especially for him; he had lamb chop and fresh peas when the rest of the family ate spinach and stew. He had orange juice and cream, and they had prunes and milk. He came to depend more and more on his poor health to obtain satisfactions, and made his diet the basis of what was, for him, a very destructive kind of attention-getting mechanism. He was considered a "sissy" in the neighborhood, and the boys teased him so much that his spirited four year old sister took him back and forth to school.

A conference was arranged with the hospital dietitian who had planned

Edward's diet. She had never thought of the Slater family as one always living on the brink of poverty, nor had she realized that even when the father was able to return to work he would never be able to earn the extra six dollars for Edward's food. Recognizing the boy's serious health condition, she had no idea that he was developing an equally serious behavior difficulty. Together we worked out an entirely new diet for the patient, basing it, in so far as possible, on the kind of food the rest of the family were having, making only such changes as were necessary to meet the needs of his special diet. The cost of the new diet was only half that of the original one.

Recently I paid a visit to this same hospital, which now has a food clinic, and heard the dietitian in conference with a patient. Her tactful and friendly manner in endeavoring to fit the prescribed diet to the patient soon gained the confidence of the latter, who rather shamefacedly confessed that he had not been following the diet too carefully—there were so few things in it that he liked. So they started with the first dislike, which happened to be white bread When soda crackers were suggested as a substitute, the patient beamed. Yes, these he liked. And so the interview continued.

I am not advocating that food habits and food idiosyncrasies be catered to unduly. Many food habits are bad and must be changed. A difficult patient presents as interesting a problem as weaning a baby. New foods are introduced one at a time. The same general technique might well be applied in making necessary changes in the diets of adults. There are many other food habits which are quite innocuous, however. The chances of a patient's following a special diet are certainly much greater if it is reasonably well adjusted to his particular food habits.

One of the phases of my work is to assist our caseworkers in planning budgets for the families under their care. It is on the basis of these budgets that financial help is given if needed. Recently one of our visitors and I were working out such a budget plan for the Zarelli family. Mr. Zarelli had deserted his wife two years ago and during that time Mrs. Zarelli had been able to get enough work to support herself and the children, and was later too ill to do more than her own housework. Since there were no other resources, the entire support of the family devolved on our Society. In order to arrive at an adequate allowance for food, the visitor brought the diet sheet which Mrs. Zarelli had been given at the clinic. There was little indication that Mrs. Zarelli was making any attempt to follow the diet, a careful scrutiny of which

made me almost willing to condone her indifference. The diet list was printed in English. Mrs. Zarelli can neither read nor write. A ten year old daughter, and the neighbor across the hall could translate it for her, but even that did not help much. For instance, the meats allowed consisted of lamb chops, chicken and squab, all far more expensive than she could afford. Some of the vegetables on her list such as Swiss chard, she had never heard of. Beet tops she had always thrown away, not knowing they were good to eat. Beets and carrots, and other root vegetables, in common with many Italians, she neither liked nor knew how to prepare. She was allowed spaghetti, but how could she prepare it if she could not have tomatoes, onions and cheese? What did such words as junket and tapioca pudding mean to her?

The objection may be raised that Mrs. Zarelli represents the exception and not the rule. I do not believe so. Her predicament is typical of that of the foreign born mother on whom is thrust a strictly American diet. The only art of cooking she knows is the one her mother taught her as a young girl. These methods she clings to. In so far as possible, she uses the same type of food she became accustomed to then.

I have had much more sympathy after this experience for these mothers who cling so tenaciously to their foreign food habits. In starting a nutrition class for a group of Italian mothers, I had been warned that it would be difficult to secure their interest, so at the first meeting I told them that in this class we would exchange our knowledge and experiences. I would teach them the value and the preparation of some American foods, and they, in turn, were to teach me some Italian cookery. After lessons on whole cereal, milk, and root vegetables, it was their turn. I was invited to a tenement home where one of the mothers showed me how they make macaroni. This we brought with us to the class, and while it was being cooked, one of the mothers, with advice and approving nods from the others, prepared the tomato sauce with which the macaroni was to be served. When the dish was finished I, who for a day was the student, received the first generous serving. The sauce was copiously flavored with garlic, and after each mouthful I wondered how I could go on. The pungent, highly seasoned sauce made my mouth burn and my eyes smart, but I remembered how the mothers had eaten cooked whole cereal, a cream soup, and carrot loaf in each of my classes. If this dish of macaroni, tomatoes and garlic was the kind of dish they liked so much, my American dishes must have tasted

particularly insipid to them. Probably they had been as uncomfortable then as I was now.

After this class my nutrition instruction was considerably less rigid. If the mothers preferred oatmeal with a tomato sauce served at the noonday meal, instead of with top milk and a few raisins for breakfast, I was entirely agreeable. The important fact was that they had at last learned to include whole cereal in their diets.

In order to follow diet recommendations, the patient and his family need, first of all, money to buy the special food required and, after that, lessons in cookery. Very often such factors as the neighborhood may create another difficulty. If certain foods are not obtainable there, it may involve considerable extra time to do the shopping in another part of the city. To a mother already overburdened with the cares of a family, housekeeping and often, in addition, a part time job, it is a real burden.

How to meet the cost of special diets is decidedly a problem in the low income groups. Miss Lucy Gillett tells of one of her worker's experiences with a client who was convalescing after an attack of influenza, but not making expected gains in strength. During the first visit of the nutritionist the woman said she was having what appeared to be an excellent diet—a quart of milk daily, butter, cream, eggs, fresh fruit and vegetables, chops and chicken, all of which had been prescribed by her doctor. Surprisingly enough, the woman still did not gain, and at the next visit the rather perplexed worker made further inquiries. The woman finally admitted that she had not told the truth. The diet she had described was the one the doctor *wanted* her to have. She was entirely willing to follow it, but could not afford to buy these foods for herself and have enough money left to feed the children. Fortunately, the nutritionist was able to plan an equally nourishing, but much less expensive diet than the one prescribed, one that could be afforded by the patient. Her health improved and, what was equally important to her, she was able to maintain her financial independence.

Mrs. Bryan of Teachers College has made a study of special diet costs which brings out some very challenging facts. In fifteen eastern hospitals, she found that the average cost of the food for special diets was one dollar per patient per day, or seven dollars per week. Ninety per cent of all patients on these diets, except those in private hospitals, are ward patients, and yet these figures show that the ward patients are getting a type of diet which they cannot possibly duplicate when they return home.

Seven dollars a week is all they are accustomed to spend for the food for a family of father, mother and one child. Furthermore, food for the family is purchased at retail prices which are considerably higher than the wholesale prices which the hospitals pay. Many housekeepers cannot even take advantage of a good retail price because they buy in such small quantities. Food is purchased not only day by day, but often meal by meal, as little as two pounds of potatoes, one quarter of a pound of butter, and one orange at a time. Dietitians with foresight are becoming aware of the existence of these factors as well as their implications and as a result their work is increasingly effective. Much is being accomplished in special diet classes and in food clinics. Most important of all is the broader vision which the student dietitian of today secures. In her college work she is urged to take a course in family case work in addition to fundamental courses in sociology and economics. In her hospital training she is given experience not only in teaching the individual patient and his family, but also experience in the wards and in the clinics. Through contacts with the social service department she becomes cognizant of all that is involved in the social adjustment of the patient. She becomes acquainted with community agencies and their functions.

Because of the nature of her work, the hospital dietitian has contact with a hundred patients to every one reached by the dietitian in social work. The hospital dietitian is entirely too modest in her evaluation of her work. Perhaps she feels isolated and does not realize the important part she plays in the lives of many people, and the opportunity she has for rendering an immeasurably valuable service.

THE COFFEE PROBLEM

P. W. PUNNETT, PH.D.
Teachers College, Columbia University

Coffee is not classed as a food, but those who drink the beverage are fairly unanimous in agreeing that its presence or absence and its quality make or mar the meal at which it is served. Hence the dietitian, as the buyer, should be especially concerned with the quality of the coffee, so that it may give satisfaction. Probably not more than ten per cent of the people who drink coffee have accurate information regarding this beverage. A brief résumé of coffee facts may be of interest.

Green coffee is produced in many countries located in the tropical belt extending around the world, including Brazil, Columbia, Venezuela, Mexico, the Central American countries, Abyssinia, Liberia, Kenya Colony, Arabia, Java, Sumatra, the Malay States and Hawaii. Each of these countries produces one or more kinds of coffees, differing from each other in flavor, in which respect no single one of them is complete. Far better flavor in the beverage can be obtained if several varieties of green coffee are combined to form what is termed a blend. Single coffees are still on the market, and can be found in the low price range, but none of them can compare in quality with a well-selected blend. The term "well-selected" is advisably used, for, unfortunately, varieties may be so combined as to give very poor quality. In other words, there are good blends and poor blends, and blends which are good for some purposes and inferior for others.

Green coffee is, of course, tasteless, and does not become valuable for beverage making purposes until it is roasted. Roasting, as the word implies, consists in heating the green beans while they are being vigorously agitated, and results in a partial burning of portions of the bean so that the desired flavor is produced. In some ways the process is similar to the toasting of a piece of bread, with differences in preparation giving corresponding taste differences. In some sections of the country a much darker product is preferred. Thus the roast commonly accepted in the southern states would be considered burned in New England, while the

New England roast would be thought rather anemic in Louisiana. For any given locality there is usually one color of roast which is commonly accepted as the best. "Color of a roast" does not imply merely appeal to the eye, for the color of the roasted bean is merely the indication to the manufacturer that the blend in question will have the desired flavor. If the roaster does not continue the process to the color predetermined, the product will be lacking in the flavor desired. Likewise, if the color is too pronounced, the flavor will be more or less destroyed, and a burned taste introduced. For each blend there is one color of roast which will bring out all of the best in flavor. Under-roasting or over-roasting will result in an inferior product.

Immediately after the coffee is roasted it is at its best. Repeated experiments in the course of my work[1] have shown that the loss of coffee flavor is far more rapid than is generally imagined. The roasted coffee bean loses sixty per cent of its coffee flavor nine days after roasting; after that the loss in flavor is very slow. In the case of the ground coffee, after this same nine day interval, a stale flavor appears and develops at a rapid rate until approximately sixteen days after roasting, when it reaches a high value that increases only slowly thereafter. In the bean coffee, staleness does not become apparent until about twenty-four days after roasting. It then develops rapidly during the next week.

These processes always occur in roasted coffee unless it is stored under very specific conditions. These conditions are as follows: the coffee must be sealed in an air-tight container with at least ninety per cent of the air removed at the time of packing and sealing, which must be within a few hours after roasting. Coffee packed in this way, called "vacuum packed," will retain its freshness and aroma for long periods. In no other way, according to present knowledge, can deterioration be prevented. It is obvious, then, that the dietitian must buy, and use immediately, coffee that is *fresh*, either vacuum packed, or, if in some other type of package, roasted not more than two days previously.

To test for flavor, this "cup test" may be made. Buy two cans of a vacuum packed coffee. Open one can, and place several ounces in any container desired. Keep the second can about three weeks, then open it and compare it with the small portion previously removed from the first can. First compare the aroma, then place three level teaspoons of each sample in separate cups and pour on boiling water. While stirring the contents for a minute or so, observe the aroma. The coffee should then

[1] Investigation on coffee supported by the American Can Company.

stand until the grounds settle and the clear beverage is just cool enough to taste. Continue tasting as the contents cool. Compare the flavor in two different parts of the mouth, in the back of the mouth on top of the tongue for coffee flavor, and at the side of the tongue next to the teeth for staleness. One may easily detect the difference.

It is possible that some of the ill effects of coffee, noted by a few of us, can be attributed to the use of stale coffee. It is also possible that the nervous effects some coffee drinkers experience are due to the use of an extra amount of weak coffee in order to produce a cup of normal strength. By weak coffee, I mean that which has been roasted five or six days previously, and has lost about half of its flavor. The caffeine does not decrease with the loss in flavor, and so the consumer gets a double dose.

A specific blend might be adaptable to certain purposes and poor for others. That applies with particular force to coffee which is intended for use in the large urns used in institutions. The average retail blend is designed for use in the home, where presumably it is consumed within a very short time after it is made. If the beverage made from such a table blend is kept hot for an hour or two, it will be found that whatever quality it had has been destroyed, and a rather unpleasant flavor has been formed. This is another experiment which one may carry out. The large coffee urn, on the other hand, requires time for operation, and its contents generally have to be kept hot for at least an hour. Fortunately, the coffee expert can prepare a special blend, referred to as a "hotel," "restaurant" or "urn" blend, which will stand up under this sort of treatment. Of course, it will not be improved by being kept hot for two hours, but the beverage will, nevertheless, taste like coffee.

The following mixture is used in such a blend:

6 parts by weight of Natural Maracaibo
3 parts by weight of Washed Maracaibo
3 parts by weight of Medellin Excelsa Bogota
5 parts by weight of Bourbon Santos 4's

There are, of course, many other such blends, a cheaper one being:

3 parts Consumo Bogota
6 parts Grinding Santos

Before applying the facts that have been given above to the specific task of buying coffee for an institution, it must be pointed out that the best coffee on the market can be ruined in the making. Use a drip filtra-

tion process, whether it is made in an urn or in a smaller pot. Do not use a bag or a cloth if you want the best results. Use the kind of top for the urn or pot that utilizes the filtering action of a clean fresh special paper, each time the coffee is made. Prepare coffee in small quantities frequently, rather than in large quantities. Never boil coffee, re-use grounds, or reheat left-over coffee.

What are the buyer's duties relative to the purchase of coffee? In the first place, if urns are used, or if coffee has to be kept hot for any length of time, select a blend that is designed for this service. Have your local coffee roaster, or one nearby, submit samples which he thinks are suitable. Try them out, preparing the coffee in a small tricolator pot or in a percolator, and keep the beverage at a serving temperature for several hours, sampling it every hour. Run two or more tests at once to get a good comparison. Have others taste, also, to see if they check your results. If none of the samples will stand two hours' keeping without serious deterioration, tell the roaster to try the two blends suggested above, or try another roaster.

When you have found a blend that will serve your purpose, one that has been roasted properly to get the maximum of flavor without the bitterness that comes from over-roasting, keep a pound in the form in which you are going to buy to serve as a color standard. Compare all the shipments received with this standard, and if there is any decided variation in color, return the coffee. Make the test that you used in selecting the blend, frequently, holding the beverage at least two hours, in order that you may be certain that you are getting what you are paying for. If you are buying in large quantities, it would be wise to have the roaster furnish you with about twenty-five pounds of the green unroasted blend, which will keep in a dry place for a year or so. Roast a quarter of a pound to the color of the standard for checking the flavor of a new lot. This could be done in a corn popper over a gas flame, or the chief engineer of your institution may be able to construct a device that is similar to the small sample roasters that the coffee expert uses.

Insist on delivery at least twice a week, and insist on *fresh* coffee. You can readily check the freshness by using the cup test, especially if you roast a fresh sample as suggested above. If the lot received is not more than a day old, it will have at least ninety per cent of the strength of a freshly roasted sample. If you want to determine that exactly, make up a series of standard cups, using eight grams (one hundred twenty-five gr.) of the freshly roasted sample in the first, ninety per cent of this amount,

or seven and a fifth grams in the second, eighty per cent, or six and two-fifths grams in the third, etc. Put eight grams of the sample to be tested in a separate cup and pour boiling water on each. Compare the strength of the sample being tested with the series of standard cups, and see which one it matches.

The easiest way to approach the question of what should be paid for coffee is to calculate what the two blends mentioned above are going to cost the manufacturer. At present prices (February 1, 1930), the first given will cost $0.17½ a pound for green coffee, while the second will cost $0.13. A year ago the same blends would have cost $0.25½ and $0.22 respectively. The present costs may increase slowly, but probably will at no time in the near future exceed the older prices. The process of roasting, including roasting loss, labor and grinding, should not exceed $0.05 or $0.06 a pound. Added to this will be delivery costs, which will vary according to the circumstances. This brings the costs from $0.23 to $0.24 for the higher priced blend and $0.19 to $0.20 for the other. The roaster's profit will depend on the quantities purchased. If you are buying in large quantities, $0.02 per pound would be a fair profit; but if you are buying only twenty-five pounds a week, the roaster will expect to make $0.05 to $0.10 per pound. Ten cents a pound is the usual profit for the retail grocer. If, furthermore, you buy the coffee in the bean and grind it yourself, you are entitled to $0.005 a pound reduction. If you buy ground coffee, ascertain that it is ground to the degree of fineness that will give the maximum strength without muddiness, when made in the device used.

To summarize: experiment until you find the best and most economical blend for your purpose; insist on two deliveries a week; check the deliveries frequently to insure that you are getting fresh, properly roasted coffee, the blend that you desire; and, finally, do all that you can to see that the beverage is not spoiled in the preparation.

EDITORIAL

The Thirteenth Annual Convention of the American Dietetic Association

The invitation of the Toronto group to hold our Thirteenth Annual Meeting at Toronto was accepted with enthusiasm by the Executive Committee, and the first convention of the American Dietetic Association to be held in Canada will meet there September 8, 9 and 10. This date, coming as it does in the early part of the fall when Canada is at its loveliest, can easily be made part of an ideal vacation trip. It was with this in mind that the tours, announcements of which have already been mailed, were planned, and arrangements made for special cars from each center. The Sanguenay and the Boston post-convention trips provide the opportunity for those who wish to see these sections of America, to make the trip inexpensively and at the same time to become better acquainted with other dietitians and to discuss mutual problems which are not fully covered at the convention.

Toronto itself is a most interesting city, having much to offer educationally and recreationally. In Queen's Park, only a few blocks from the Royal York Hotel, are the Provincial Parliament Buildings, and Toronto University, the largest university in the British Empire. Claribel Hazlett, chairman of local arrangements, together with other local committees, is planning trips about this fascinating city. Niagara Falls is only a short boat trip from Toronto.

Kate Daum is chairman of the program, thus assuring excellent meetings. Violet Ryley is chairman of the hospitality committee, and Alice Pidgeon is local representative of exhibits. The Toronto group is working to make this first Canadian Convention a memorable one.

D. I. L.

The Organization Book of the Association

The officers of The American Dietetic Association have recognized the need for outlining the policies and methods of procedure which have been adopted by the Association. They have recommended, therefore, that our policies and activities be summarized and arranged in an easily

accessible file for the use of the officers and section chairmen, as an aid in more effectively planning their work for the year.

The compilation of this material into a form to be known as a Precedent Book was first considered; later, after further deliberation, the officers were convinced that the term Precedent Book, with all its advantages, might lead to the disadvantage of confining future activities to past policies, and thus restrict the development of the Association along certain activities not yet pursued. After some discussion of this term, the name, Organization Book, was suggested. This title, conveying so clearly the idea that had stimulated the appointment of a committee to develop this work for the Association, brought about the acceptance of the term, Organization Book.

The foremost aim in compiling an Organization Book for the Association is to assure greater continuity in the development of the organization. Effort has been made to select material which summarizes the work that has been accomplished in the various activities pursued, to state definite policies adopted by the Association, and to list suggestions for future development. This has been done for the purpose of aiding incoming administrations, so that it will be possible for newly elected officers to carry on the progress of the Association from the point where the outgoing administrations relinquish responsibility. The result of this undertaking should bring about more rapid progress and greater efficiency in the Association.

MILLIE E. KALSEM.

THE DOCTOR LOOKS AT THE DIETARY DEPARTMENT

In the March 29, 1930, Hospital Number of the *Journal of the American Medical Association*, the problems of hospitals, medical care, patients, medical education, and hospital service in general are discussed in detail. The hospital food problem, with its weighty importance in determining hospital costs and, very largely, the hospital's success in a community, is dismissed in the following brief paragraph:

The Unalterable House Diet

"The patient discovers shortly that there are numerous other phases of hospital existence not to his liking—for instance, the meal hour, an important event in every man's life. The house diet, unalterable as the laws of the Medes and Persians, and garnished with a prune, apparently is planned for its calories and vitamins, but with little regard, if any, for individual taste, much less national appeal. The meanest sort of hotel or restaurant has long since abandoned the old-fashioned iron-clad American plan meal, with its leit-motif

'Take it or leave it.' The cafeteria and the dairy lunch offer selective menus of wide variety and attractiveness, with hot things served hot and cold things served cold. Why not hospitals?"

The writer, having doubtless drawn his conclusions from experience, does not offer any definite constructive criticism, unless one may interpret his remarks as indicating a belief that the selective menu, once installed, would automatically end all dietary dissatisfactions and dietitians' difficulties.

M. P. H.

Does the Dietitian Buy?

A recent survey made under the direction of the Business Office of the Association, for determining the dietitian's position as buyer, brought out the following facts, institutions of all types and sizes being represented in the statistics. Among those replying were hospitals, commercial and school cafeterias, and colleges. It was found that fifty-four per cent of the dietitians purchase all food for their departments; twenty per cent purchase part of the food; twenty-one per cent recommend the purchase of food; and five per cent do not purchase or recommend any of the food.

With reference to equipment purchasing, twenty per cent of the dietitians purchase all equipment for their departments; twenty-six per cent purchase part of the equipment; forty-two per cent do not purchase, but *specify* the kind to be purchased; and three per cent do not purchase or recommend any of the equipment.

The following table, based on statistics from one hundred and thirty institutions, of average bed capacity of five hundred and fifty-four, indicates something of the size of expenditures in dietary departments.

Item	Amount	Cost
Canned fruits and vegetables	91,115 doz. cans	$656,028
Flour	2,778,960 lbs.	277,876
Sugar	7,113,506 lbs.	355,675
Cereals—prepared	439,455 lbs.	87,891
Cereals—to cook	619,943 lbs.	61,934
Butter	2,160,548 lbs.	907,430
Margarine	152,736 lbs.	32,547
Milk—fresh	7,432,832 gals	2,229,850
Milk—evaporated	4,659 No. 10 cans	2,531
Milk—powdered	70,695 lbs.	25,247
Total		$4,926,776
Amount spent per institution per year these foods only. Average		$37,852

It is estimated that there are six thousand hospitals in the United States requiring dietitians. Approximately $300,000,000 are expended in dietary departments of these hospitals each year. The dietitian, in the majority of instances, either directly controls or definitely influences the expenditure of an average of $50,000 per year for food and equipment.

CURRENT COMMENT

The Association's Affiliation Program

The following lists of local and state associations, including the name of at least one officer for each group, are complete to date, according to available information. The editor of the **Journal** and the chairman of the Affiliation Program would greatly appreciate receiving bi-monthly reports from the secretaries of each local and state association, giving interesting news items concerning their membership and association activities. These reports will be used for compiling material for the **Journal** and as an aid in development of plans for national organization.

The response to letters sent out to representative dietitians, requesting them to take an active interest in organizing local dietetic associations, has been most gratifying. Several new state associations have also been formed, and it is hoped that interest in this work will keep on growing. Particular attention is called to the new Tri-state Dietetic Association as a suggestion to other regions where the number of dietitians is too few to warrant the formation of an individual state association. It is hoped that the new Tri-state Association will soon be in a position to apply for affiliation.

The American Dietetic Association needs a closer bond with the dietitians of the country. This can best be secured by increasing the number of affiliated state associations and by the organization within each territory of strong local groups.

The chairman of the Affiliation Program has been especially pleased with the interest shown by heads of Home Economics Departments in colleges and universities in the new plans for organization of dietitians. All state and local leaders are urged to solicit their help and to work in close coöperation with them. Instances are known where such departments have greatly facilitated early organization plans by supplying the mimeographing and postage needed in the preliminary campaign.

The chairman for the program at the next annual meeting in Toronto

has arranged a special dinner meeting for discussion of affiliation problems. We hope that each state and local association will send a representative to this dinner.

State associations affiliated with the American Dietetic Association under the old plan. These associations have all been requested to modify their constitutions to permit all local associations within the state to affiliate with the state association already formed: California State Dietetic Association, Elizabeth Hayward, California Fruit Grower's Exchange, Los Angeles; Minnesota State Dietetic Association, Harriet Warrington, U. S. Veterans' Hospital, Fort Snelling; Massachusetts Dietetic Association, Margaret McGovern, Boston City Hospital, Boston; Indiana State Dietetic Association, Margaret Marlowe, Methodist Hospital, Indianapolis; Washington Dietetic Association, Ruth Walker, Department of Home Economics, Public Schools, Seattle; British Columbia Dietetic Association, Ethel C. Pipes, Vancouver General Hospital, Vancouver; Ontario Dietetic Association, Annie L. Laird, School of Home Economics, University of Toronto, Toronto; Quebec Dietetic Association, H. L. Hunter, 719 University St., Montreal; and District of Columbia Dietetic Association, Grace C. Bulman, U. S. Veterans' Bureau, Washington.

Local dietetic associations that had been affiliated with the American Dietetic Association under the old plan. These have been urged to modify their constitutions and form the nucleus for state dietetic associations: Chicago Dietetic Association, Minnie Kalsem, Cook County Hospital, Chicago; and Rochester Dietetic Association, Effie Winger, Rochester General Hospital, Rochester, New York.

State association now applying for affiliation with the American Dietetic Association. Colorado State Dietetic Association, Cora E. Kelley, Secretary, Colorado State Hospital, Pueblo; Virginia State Dietetic Association, Gertrude Brown, President, McGuire Clinic, St. Luke's Hospital, Richmond; and Oregon Dietetic Association, Helen Churchill, Portland Medical Hospital, Portland.

Existing state associations that have not yet applied for affiliation with the American Dietetic Association. Rhode Island Dietetic Association; Clara Watkins, Butler Hospital, Providence; Connecticut Dietetic Association, Isabel Hunter, Bridgeport Hospital, Bridgeport; and Michigan State Dietetic Association, Lenna Cooper, University of Michigan, Ann Arbor.

Recently organized state associations that we hope will soon apply for affiliation with the American Dietetic Association. Tri-state Dietetic As-

sociation (Tennessee, Arkansas, and Mississippi), Fairfax T. Proudfit, President, 1968 Central Avenue, Memphis, Tenn., Mrs. Love, Vice-president, Baptist Hospital, Little Rock, Ark., Miss Marks, Secretary and Treasurer, Baptist Hospital, Memphis, Tenn.; Iowa State Dietetic Asociation, Dr. Kate Daum, President, University Hospital, University of Iowa, Iowa City, and Dorothy I. Anderson, Secretary and Treasurer, Department of Hygiene, Iowa State College, Ames.

State associations being planned. Missouri, through the activities of Ruth Cooley and Eugenia Martin, St. Louis; and Porto Rico, through the work of Mrs. Rita Lang, Hospital of the School of Tropical Medicine, San Juan.

Existing local dietetic associations. Baltimore Dietetic Association, Alma Bering, Sheppard and Enoch Pratt Hospital, Towson, Md.; Milwaukee Dietetic Association, Ada B. Loth, Milwaukee County Hospital; New York City Dietetic Association, Mary Northrop, Montefiore Hospital; St. Louis Dietetic Association, Eugenia Martin, Barnes Hospital; Cincinnati Dietetic Association, Ruth Sentiff, Bethesda Hospital; Clevelend Dietetic Association, Mary T. Terry, City Hospital; Grand Rapids Dietetic Association, Ardis Olive Bull, Grand Rapids; Southeastern Michigan Dietetic Association, Mary Harrington, Harper Hospital, Detroit; Philadelphia Dietetic Association, Rose T. Baker, Drexel Institute; Dallas Dietetic Association, Ruth Cooper, 4826 Worth Street, Dallas; Louisville Dietetic Association, Martha Olson, Louisville City Hospital; Kansas City Dietetic Association, Mrs. Clarence Cross, 2744 Gillham Road, Kansas City, Mo.; Tidewater Dietetic Association, Bertha E. Ide, Norfolk Protestant Hospital, Norfolk, Va.; and Minot Dietetic Association, Ethel E. Casey, State Teachers College, Minot, N. D. (If there are others, please notify Martha Koehne, University of Tennessee. Any omission from the lists above has been from lack of information.)

Localities where active work is in progress towards forming local associations. El Paso, Texas, in charge of Bess G. Lay, William Beaumont Hospital; Albany, New York, in charge of Virginia H. Ray, Albany Hospital; Chattanooga, Tenn., in charge of Anna L. Carpenter, Red Cross Nutritionist; Green Bay, Wisconsin, in charge of Helen E. Carmody, St. Mary's Hospital; Augusta, Georgia, in charge of Gladys L. Stoddart, University Hospital; Asheville, N. C., in charge of Jessie E. Chick, Ambler Heights; Des Moines, Iowa, in charge of Myrtle Larson, Iowa Lutheran Hospital; Reading, Pa., in charge of Catharine L. Palmer,

Reading Hospital; and Paterson and Newark, New Jersey, in charge of Winifred Cushing, Paterson General Hospital.

Edith R. Tilton, State University Hospital, Oklahoma City, and Helen Burton, University of Oklahoma, are energetically developing plans for an Oklahoma State Dietetic Association.

The Baltimore Dietetic Association and the Cincinnati Dietetic Association have each sought affiliation with the American Dietetic Association. Inasmuch as the new plan does not include affiliation of local associations, these associations are being urged to organize state associations and encourage the formation of other local units, to conform with the new plan.

Ruth C. Hanson, the Queen's Hospital, Honolulu, reports only three dietitians in Honolulu, with the statement that all are active in the Home Economics Association there. She feels it unwise now to try to form a separate group for dietitians alone.

MARTHA KOEHNE,
Chairman, Affiliation Program,
University of Tennessee,
Knoxville, Tenn.

CURRENT LIST OF HOSPITALS GIVING APPROVED COURSE TO STUDENT DIETITIANS*

Hospital	*City*	*Dietitian*
British Columbia:		
Vancouver General	Vancouver	Ethel Pipes
California:		
Fairmont Hospital	San Leandro	Eloise Hammel
California Lutheran	Los Angeles	Reeva Hinyan
Hospital of Good Samaritan	Los Angeles	Hester Wieman
Methodist Hospital	Los Angeles	Elizabeth Hayward
Scripps Metabolic Clinic	La Jolla	Helen Anderson
Highland Hospital	Oakland	Frances M. Taylor
Stanford University and Medical Schools	San Francisco	Charlotte Sloan
Cottage Hospital	Santa Barbara	Muriel Gowans
Connecticut:		
Bridgeport Hospital	Bridgeport	Leslie Hunter
Grace Hospital	New Haven	Mary Merle Buckles
Waterbury Hospital	Waterbury	Doris Keller
Illinois:		
Cook County	Chicago	Millie Kalsem
Michael Reese	Chicago	K. Mitchell Thoma
Presbyterian	Chicago	Elizabeth Hennecke

* May 1, 1930.

Hospital	*City*	*Dietitian*
St. Luke's	Chicago	Mary Sorenson
Mercy Hospital	Chicago	Mary McKittrick
Ravenswood	Chicago	Leota West
Wesley Memorial	Chicago	Elizabeth H. Tuft
Evanston Hospital	Evanston	Louise Y. Gilbert
Indiana:		
City Hospital	Indianapolis	Amy Colescott
Indiana University	Indianapolis	Lute Troutt
Methodist Hospital	Indianapolis	Mrs. Margaret Marlowe
Iowa:		
University of Iowa	Iowa City	Kate Daum
Maryland:		
Johns Hopkins	Baltimore	Phyllis D. Rowe
Massachusetts:		
Children's Hospital	Boston	Martha Stuart
Massachusetts General	Boston	Marion Floyd
Peter Bent Brigham	Boston	Thelma Tubbs Currier
Boston City Hospital	Boston	Margaret McGovern
Beth Israel	Boston	Maniza Moore
Michigan:		
University Hospital	Ann Arbor	S. Margaret Gillam
Harper Hospital	Detroit	Mary Harrington
Minnesota:		
Ancker Hospital	St. Paul	Winifred Howard
Charles T. Miller	St. Paul	Eva Gregorson
Minneapolis General	Minneapolis	Jeanette Goldthorpe
University Hospital	Minneapolis	Gertrude Thomas
St. Barnabas	Minneapolis	Marion Ladner
Missouri:		
Barnes Hospital	St. Louis	Eugenia Martin
Research Hospital	Kansas City	M. Ethel Ollis
Nebraska:		
Lincoln General	Lincoln	Leta B. Linch
New York:		
Albany Hospital	Albany	Virginia H. Ray
Buffalo City	Buffalo	Ursula Senn
Clifton Springs Sanitarium	Clifton Springs	Anna Paschal
Lebanon Hospital	New York City	Betsy Helburn
Presbyterian Hospital	New York City	Louise Clarke
Montefiore Hospital	New York City	Mary Northrop
Rochester General	Rochester	Effie Winger
Strong Memorial	Rochester	Grace Carden
Fifth Avenue	New York City	Angelina Phillips
Flower Hospital	New York City	Winifred Connell
Grasslands Hospital	Valhalla	Rhoda A. Tyler
North Carolina:		
Watts Hospital	West Durham	Margaret Fitzhugh
Ohio:		
Miami Valley	Dayton	L. Atta Bolender
Mt. Sinai	Cleveland	Helen Mallory
Cincinnati General	Cincinnati	Eleanor Tierney

Hospital	*City*	*Dietitian*
Oklahoma:		
State University	Oklahoma City	Edith Tilton
Pennsylvania:		
St. Josephs	Philadelphia	Sister M. Alexius Gavin
Philadelphia General	Philadelphia	Elizabeth Miller
Homeopathic Hospital	Pittsburgh	Irene Wilson
Western Pennsylvania	Pittsburgh	Charlotte Addison
Tennessee:		
Vanderbilt University Hospital	Nashville	Lois Beeby
Utah:		
Latter Day Saints	Salt Lake City	Katherine Bielby
St. Mark's	Salt Lake City	Elizabeth Steelman
Virginia:		
Medical College of Virginia	Richmond	Aileen Braun
Washington, D. C.:		
Walter Reed General	Washington	Grace H. Hunter
Washington:		
Interne Dietitian Training under auspices of the Washington branch of the A. D. A. training arranged through affiliation at the following hospitals:		
Tacoma General	Tacoma	Catherine Noonan
Children's Orthopedic	Seattle	Dorothy Goodrich
Seattle General	Seattle	Evelyn Engdahl
Northern Pacific Beneficial Association affiliated with Tacoma Hospital	Tacoma	Gertrude Stephens

Recent Information from the Bureau of Home Economics, Department of Agriculture

Olives. Ripe olives of the Manzanillo variety have been found to be rich in vitamin A. This is a medium-sized olive grown in California. It contains from fourteen to twenty per cent of oil, and when prepared for table use has a rich nutty flavor. Some unrefined fats and oils have been found rich in one or more vitamins. The bureau specialists thought that ripe olives might also be a valuable source of at least one of these substances so important in good nutrition. Feeding tests confirmed their expectations. Vitamin A was abundant. Similar tests are under way on the Mission variety of processed ripe California olives, which contain an even higher proportion of oil than the Manzanillo. Eventually the experiments will also include tests of the vitamin content of pickled green olives.

Meat. A slight decrease in total meat production and consumption in the United States last year, as compared with 1928, is reported. The

total production of dressed meat, not including lard, is placed at 16,803,000,000 pounds in 1929, as compared with 16,955,000,000 pounds in 1928. The 1929 total is made up of 6,065,000,000 pounds of beef as compared with 6,082,000,000 pounds in 1928; 816,000,000 pounds of veal against 814,000,000 pounds in 1928; 699,000,000 pounds of lamb and mutton against 671,000,000 pounds; and 9,223,000,000 pounds of pork against 9,387,000,000 pounds. Of the total 1929 production, 66.56 per cent came under Federal inspection. The remainder was composed of the farm kill and the commercial slaughter not Government inspected. Some of the latter is inspected by State and local authorities, but the quantity so inspected is not known. Goat meat, the production of which aggregated about 1,000,000 pounds in each year, is not included in the total. Per capita consumption of meats, excluding lard, is placed at 136.8 pounds, compared with 138 pounds in 1928, and 149.7 pounds in 1924, which was the record year since 1908. The smallest per capita consumption in the last thirty years, 120.1 pounds, was in 1917.

Pork is shown to be the most popular meat in the American diet, the per capita consumption last year being 72.8 pounds as against 73.9 pounds in 1928, and a high of 74.7 pounds in 1923 and 1924. The smallest consumption per capita was 49.3 pounds in 1917. The trend in per capita consumption of beef has been downward since 1926, the Bureau says, when 63.6 pounds per person was consumed. Last year consumption was 51.4 pounds per capita, as against 51.7 pounds in 1928. Per capita consumption of lamb and mutton has been increasing since 1922, and was 5.8 pounds in 1929 as against 5.6 pounds in 1928.

Pork showed the greatest decrease in both production and consumption last year, the decrease being attributed to a reduction in slaughter supplies. Production of beef decreased slightly, but total consumption increased as a result of larger imports. Total veal production was slightly larger last year but the increase was offset by a decrease in imports; consequently there was only a slight change in total veal consumption. Lamb and mutton showed the greatest relative increase in both production and consumption, due to increased slaughter supplies.

Sugar. Estimating the 1929 and 1930 world sugar drop at 29,833,000 short tons of raw sugar as compared with last season's record crop of 30,281,000 short tons, the Bureau says that "the world's visible supply of sugar is greater than in any previous year, and shows a continuation of the large supplies which have been increasing steadily since 1922–23, with the exception of a drop of about 1,000,000 short tons in

1926–27." The large supply of sugar is reflected in the low price level. The average wholesale price of raw sugar at New York for the year 1929 was 3.8 cents as compared with 4.2 cents for 1928. This is the lowest on record since 1913, when the average for the year fell to 3.5 cents per pound. No improvement in prices is as yet compared with 3.8 in January, 1929, and 4.5 cents in January, 1928.

Watermelons. Watermelons of the Tom Watson variety were found to be a good source of vitamin A, and are also well supplied with vitamin C. Vitamins B and G were shown to be present in watermelons in detectable quantities. The experiments covered only this one variety of watermelon, but the Tom Watson makes up about ninety per cent of commercial shipments. Moreover, other red-fleshed varieties are so similar to the Tom Watson in their structure, and all field-grown watermelons are handled in so much the same way, that the Bureau specialists believe these vitamin results can be applied to the American watermelon crop as a whole.

Antifat "cures." No drug or mixture of drugs known to the medical profession at the present time can be offered for the promiscuous use of the public in reducing weight without introducing an element of danger, warns Dr. F. J. Cullen of the Food, Drug and Insecticide Administration:

> "These preparations frequently contain thyroid and laxatives. The promiscuous use of thyroid may prove very harmful unless given under the advice of a physician personally familiar with the subject's physical condition. The department has on record an instance where death has followed an overdose of a preparation containing thyroid. Some preparations contain poke root (phytolacca), a poisonous drug, and others, analysis shows, contain nothing that could possibly have the slightest effect in reducing flesh."

Careful dieting and proper exercise are the only safe methods of weight reduction known to the Department of Agriculture specialists. Dieting and exercise, to be effective, they say, must be continued for long periods. In many cases other physical conditions make it unwise for fat people to try to reduce weight rapidly. As a general rule, fat people should diet and exercise under the guidance of a skillful physician. Loss of flesh is by no means a blessing, Dr. Cullen warns, if accompanied by loss of health, energy or strength.

BOOK REVIEWS

Feeding the Family. Third Edition. By Mary Swartz Rose. Price, popular edition, $5.50, classroom edition, $3.75. New York: The Macmillan Company, 1929, pp. 459.

In her revision of this well-known handbook, Dr. Rose has adhered to the same general arrangement and has used the same chapter headings as in the 1924 edition, with the addition of attractive and appropriate silhouettes at the head of each chapter. Three-fourths of the illustrations are either entirely new, or, as in the case of foods, greatly improved in set-up. The book is larger than the earlier editions, and contains considerably more reading matter.

In the first chapters additions have been made which give the results of recent research in nutrition. Many more diets for various types of people are included.

Table 1 in the appendix now includes data on the size, weight, and composition of 100 Calorie portions of many articles of diet, as well as the weight and composition of standard measures of staple foods. These tables were separated in former editions. The present arrangement greatly facilitates their use. One hundred or more additions have been made to these lists.

The dietary recipes now found in Table 2 of the appendix have likewise increased in number by seventy-five or more. The author continues to give all data on composition of foods in terms of calories of the foodstuffs, which probably makes for better understanding on the part of the lay reader.

Feeding schedules for babies have been simplified, and much emphasis has been placed on the use of cod liver oil and on the value of sunlight. Although still adhering to her belief that meat should be withheld from the diet of children until the ages of seven or eight, Dr. Rose has included liver, once or twice a week, in her dietary recommendations for young children.

A very attractive popular edition for housewives is now available, as well as the familiar green edition.

MARTHA KOEHNE,
Professor of Home Economics,
University of Tennessee,
Knoxville, Tennessee.

Rickets, Osteomalacia and Tetany. By Alfred F. Hess, M.D. Philadelphia: Lea and Febiger, 1929.

This volume should be included in the library of both the practising physican and the nutrition worker. In a very interesting and practical way, Dr. Hess has combined the results of his years of research on rickets with the most recent findings in the study of vitamins. In each disease studied, there is a logical résumé of the history of the disorder, followed by the experimental findings, etiology, pathogenesis, metabolism, pathology, symptomatology, radiographic signs, diagnosis and prognosis. All the data included show a painstaking search for truth, by a thorough scientist.

The chapters on Late Rickets are interesting and include many of the post-war findings of Germany, Austria and Poland.

In the chapters on Osteomalacia, the new technique used in the study of rickets and applied to this closely related disorder by investigators in Peking, India and Bosnia, is discussed, and there are comparisons of radiographic appearances, blood chemistry, and responses to therapy.

Infantile tetany has been studied from the standpoint of acid-base equilibrium, and the results of acid therapy and ultra-violet treatment are carefully recorded.

Dr. Hess' book will be invaluable as a reference for anyone interested in pediatrics either from the scientific, clinical, or nutritional standpoint.

E. L. FEENEY, M.A.,
Pratt Institute, Brooklyn.

The Carbohydrate Content of Foods. By R. A. McCance and R.D. Lawrence. Price 2s. net. London: His Majesty's Stationery Office, 1929, pp. 73.

The authors have felt that accurate information about the values of the carbohydrate constituents in common foodstuffs has been surprisingly scanty and inaccessible, and defective in three ways. Such published analyses, according to the authors, were to be found only after search in scattered literature, and offer grave numerical discrepancies. These figures refer chiefly to uncooked foods, and, in the third place, most of the published figures failed to distinguish between the total carbohydrate considered in the chemical sense, and that part of it which is effective in the physiological sense and usefully available by the body. With the coöperation of the Medical Research Council, Drs. McCance and Lawrence have submitted figures for both raw and cooked foods, giving the carbohydrate content in the form of readily available carbohydrates, that is, starches and sugars; the possibly available material, such as the hemicelluloses; and the unavailable carbohydrate residues, grouped together as fibre, and mainly composed of cellulose.

In addition to the tables of carbohydrate content of foods, the authors discuss the food value of vegetable carbohydrates, and give a lengthy bibliography of source material.

M. P. H.

The Most Nearly Perfect Food. By Samuel J. Crumbine, M.D. and James A. Tobey, Dr. P. H. Price $2.50. Baltimore: Williams and Wilkins Company, 1929, pp. 293.

In this valuable addition to the literature on nutrition, Drs. Crumbine and Tobey have told in a fairly popular way the whole story of milk. An interesting historical account of milk through the ages has been given, showing how this food has nourished the race and contributed to its longevity and good health. The place of milk in modern diets and in good cookery, and ways of using milk, are outlined. Methods for producing clean and safe milk are thoroughly discussed. A complete survey of the available milk products is made, with their relative merits. There is a most interesting account of the way in which milk is produced and marketed in the various parts of the world.

While the authors have written this book primarily for the lay reader, facts have been included which will make it useful and informative to teachers of home economics, dietetics, agriculture and dairy science, medicine, and public health, particularly child and school hygiene.

M. P. H.

Diet and Efficiency. A Five-Year Controlled Experiment on Man. By Harold H. J. Holck. Price $1.00. Chicago: University of Chicago Press, 1929, pp. 72.

This is a report of an experiment endeavoring to secure objective evidence of the alleged effects of a thorough to excessive mastication of the food by man, showing that the "fletcherizing" period led to a somewhat lower food consumption, not followed by superior physical and mental performance. The distinct fall in neuro-muscular endurance, despite the fact that the subject's body weight did not fall below the generally accepted standard, seemed to indicate that the latter standard is not necessarily the optimum for a given individual. The booklet was written in an endeavor to shed further light on the relation of diet to health and efficiency. The optimum diet for man is not yet known, but it is obvious that average human health and vigor can be sustained by a great variety of dietaries, provided these yield the necessary energy and the minimum of a few dietary essentials.

M. P. H.

The Gourmets' Almanac. By Allan Ross MacDougall. Price $4.00. New York: Covici-Friede, 1930, pp. 318.

There can be no disagreement with Mr. MacDougall's statement that this is not "just another cook-book." It is, rather, an encyclopedia of unusual recipes, anecdotes,

songs, proverbs, pictures, folklore relative to feast and fast days, and literary bits of interest to the gastronomer. It is altogether likely that one would find a dearth in America of both the patience and the ingredients necessary to the preparation and most complete enjoyment of many of the delicacies described. One suspects, too, that the proverbial grain of salt is needed at times.

The garland, also is delightful, with its variety of qotations ranging from Ecclesiates to Lewis Carroll's *Turtle Soup*. Incomplete though this garland admittedly is, it may be regretted that several lines, typifying the exotic beauty of Keats' *Eve of St. Agnes*, are not included:

"While he from forth the closet brought a heap
Of candied apple, quince, and plum, and gourd;
With jellies soother than the creamy curd,
And lucent syrops, tinct with cinnamon;
Manna and dates, in argosy transferred
From Fez; and spicéd dainties, every one,
From silken Samarcand to cedared Lebanon."

This compendium of gastronomic adventures, gathered from all parts of the world, is most evidently a labor of love. Pleasing to the palate and to the mind, this is a welcome addition to the literature of cookery.

OLIVE F. OLMSTEAD, A.B.

The Normal Diet. Third Revised Edition. By W. D. Sansum, M.S., M.D., F.A.C.P. Price $1.50. St. Louis: C. V. Mosby Company, 1930, pp. 134.

In addition to normal diet menus, diets for special conditions have been included in this edition, illustrating how such diets may be built up without violating any of the fundamental principles.

CURRENT LITERATURE

KATHLEEN M. LEWIS

American Journal of Diseases of Children

Vol. 39, January, 1930

The relative digestibility of unsweetened evaporated milk, boiled milk and raw milk by trypsin in vitro. Z. Wallen-Lawrence, and F. C. Koch.—p. 18.

The comparative value of irradiated ergosterol and cod liver oil as a prophylactic antirachitic agent when given in equivalent dosage according to rat units of vitamin D. D. J. Barnes, M. J. Brady and E. M. James.—p. 45.

*Celiac disease. M. Van K. Nelson.—p. 76.

Vol. 39, February, 1930

*Citric acid milk in infant feeding. J. E. Gonce Jr., and H. L. Templeton.—p. 265.

I. The carbohydrate metabolism of the normal newborn infant. H. M. Greenwald and S. Pennell.—p. 281.

Vol. 39, March, 1930

Influence of feeding on certain acids in feces of infants. J. A. Gerstley, C. C. Wang and A. A. Wood.—p. 487.

*II. The carbohydrate metabolism of the normal newborn infant. H. M. Greenwald and S. Pennell.—p. 493.

Celiac disease. The successful feeding of four children with celiac disease is reported. Normal growth and arrest of dental caries were obtained in each case. Protein milk was found to be undesirable, due to the increased fat and calcium output. The enzyme theory concerning the efficacy of the banana was not upheld. When given between meals, dextrose was tolerated in relatively large amounts, and permitted an adequate energy intake.

Citric acid milk in infant feeding. Citric acid milk (4 grams dehydrated citric acid per quart of boiled milk at room temperature) is easy to prepare, equals lactic acid milk in beneficial results, is of constant acceptability, and so is especially fitted for use in rural districts or in all homes in which ice cannot be obtained.

II. The carbohydrate metabolism of the normal new-born infant. It is concluded that in new-born infants the best tolerance is for lactose as it occurs in breast milk. Infants were fed dextrose, saccharose, lactose and dextrimaltose. The best rate of absorption occurred after the ingestion of the sugars in the order above named.

American Journal of Public Health

Vol. 20, February, 1930

*Pasteurized dried fruits. C. R. Fellers.—p. 175.

Vol. 20, April, 1930

*Vitamin content of ethylene treated and untreated tomatoes. D. B. Jones and E. M. Nelson.—p. 387.

Pasteurized dried fruits. From a public health standpoint, pasteurization marks a definite advance in the merchandizing of dried fruits. Recently, because of the work of Prescott and Hunwicke, pasteurizing as well as sealing dried fruit in packages has come into use, and because most fruits may be pasteurized in the paper cartons, commercial processes have been quickly developed to obviate the possibility of bacterial infection from these foods. Such an outbreak has been reported.

Vitamin content of tomatoes. According to work done by House, Nelson and Hahen, ripe tomatoes are richer in vitamin A than green tomatoes, irrespective of the methods used in ripening. They also found that green and ripe tomatoes contain essentially the same amount of vitamin B, irrespective

of methods used in ripening. These authors, however, did not report that the tomatoes were treated with ethylene. Jones and Nelson used only tomato juice in their experiments, but they find as a result of their work, that vine ripened tomatoes are preferable as a source of vitamins to those picked perfectly green and ripened with ethylene. It was noted that the ethylene treatment had no deleterious effects on vitamins already developed.

Hospital Management

Vol. 29, February 15, 1930

Some typical hospital menus.—p. 84.

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Menus of Wateska Illinois hospital.—p. 76.

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Meeting the hospital's food obligations. K. Daum.—p. 46.

Who's to blame for serving tray after patient goes. M. E. Ruetz.—p. 100.

Journal of American Medical Association

Vol. 94, January 25, 1930

The central nervous control of sugar metabolism. Editorial.—p. 267.

Vol. 94, February 8, 1930

Mechanical factors in constipation: conditions revealed by careful examinations. D. Smith.—p. 387.

The treatment of pernicious anemia with raw and cooked swine stomach. H. M. Conner.—p. 388.

*Vitamin D in tuberculosis. Editorial.—p. 414.

The committee on foods. Current Comment.—p. 415.

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*The undernourished child. Editorial.—p. 486.

*A "bite" between meals. Editorial.—p. 487.

Vol. 94, February 22, 1930

*The etiology of infantile spasmophilia. H. J. Gerstenberger, J. I. Hartman, G. R. Russell, and T. S. Wilder.—p. 523.

*Food factors other than vitamin D in rickets. W. Weston.—p. 529.

*Infection of accessory sinuses and upper respiratory tract in vitamin A deficiency. B. R. Shurly and R. G. Turner.—p. 539.

The antiedemic action of calcium in experimental irritative edemas. M. L. Tainter and W. Van Deventer.—p. 546.

Vol. 94, March 1, 1930

The epidemiology of pellagra. Editorial.—p. 637.

Rôle of body tissues in acid-base equilibrium of the blood. Current Comment.—p. 639.

Vol. 94, March 8, 1930

*Our daily bread. Editorial.—p. 718.

Dehydration in the treatment of epilepsy. Current Comment.—p. 721.

Vol. 94, March 15, 1930

Metabolic "Waste Heat." Editorial.—p. 794.

The loss of pancreatic juice. Editorial. —p. 796.

Vol. 94, March 22, 1930

*Liver treatment in the pernicious anemia of pregnancy. R. Peterson, H. Field Jr., and H. S. Morgan.—p. 839.

The antirachitic value of irradiated wheat. F. F. Tisdall and A. Brown.—p. 854.

*The dietetic care of the vertical patient. E. M. Geraghty.—p. 867.

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*Refrigerating systems and public health. S. W. Wynne and J. Oberwager.—p. 1061.

Vol. 94, April 12, 1930

Responsibilities of the medical profession in the health program of the public schools. F. Moore.—p. 1109.

*Allergic insulin reactions: report of a case exhibiting severe gastro-intestinal allergic reactions following injections of insulin. J. R. Williams.—p. 111.

*Gastric disturbances. A. J. Beams and E. M. Geraghty.—p. 1137.

Vitamin D and the parathyroids. Editorial.—p. 1148.

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*Gastric disturbances. A. J. Beams and E. M. Geraghty.—p. 1234.

Vol. 94, April 26, 1930

Comparative value of viosterol and cod liver oil as prophylactic antirachitic agents: a clinical study. A. G. DeSanctis and J. D. Craig.—p. 1285.

*Constipation. A. J. Beams and E. M. Geraghty.—p. 1296.

*Vitamin balance. Editorial.—p. 1323.

*The carbohydrates of almonds. Current Comment.—p. 1324.

Vitamin D in tuberculosis. A recent study of the rôle of vitamin D in tuberculosis, conducted on fifty-eight tuberculous patients, led the investigators to the conclusion that such therapeutic value as cod liver oil possesses in tuberculosis does not depend on its relatively high concentration of vitamin D. As cod liver oil is so rich in

vitamin A, which viosterol, although of high antirachitic potency, does not contain, it has been demonstrated that the latter can by no means be regarded as the therapeutic equivalent, nor can it entirely replace cod liver oil in the feeding plan of the infant.

The undernourished child. After a study of eighty-three children who had not responded to former attempts toward bringing up to normal weight, Chi Che Wang and her co-workers concluded that there is no striking or essential abnormality of metabolism in the under-nourished child, if the latter is free from physical defects. It was also concluded that the underweight child can be made to gain in weight if sufficient attention is paid to its diet and food habits, and that the growing child requires a high protein intake.

A "bite" between meals. It is suggested that the emphasis lately placed upon minerals and vitamins may have obscured somewhat the importance of energy requirements and calorie estimates. Whatever the calorie intake estimated, however, the "bite" between meals—ice cream, chocolate bars, malted milk, etc.—should be kept in mind as an additional source of energy, particularly so when one considers that the average ten cen candy bar yields four hundred and fifty calories, and a serving of ice cream five hundred calories.

Etiology of infantile spasmophilia. Gerstenberger, Hartman, Russell and Wilder here present additional evidence in support of their previously advanced theory that three factors are essential to the development of infantile spasmophilia: (a) rickets, (b) exposure of the rachitic infant to the influence of the antirachitic factor in one form or another in a sufficient degree to produce some healing, and (c) interruption of the exposure, or inadequacy of the exposure. Cases were reported which substantiated such conclusions.

Food factors other than vitamin D in rickets. Weston asserts that it is important to consider rickets from a mineral point of view as well as from a vitamin one. He cites the native diet of rickets-free Eskimos, west Irelanders and inhabitants of the island of Lewis. It has also been observed that premature infants and twins are particularly susceptible to rickets. Various theories relative to rickets are mentioned.

Infection of accessory sinuses and upper respiratory tract in vitamin A deficiency. Studies of Shurly and Turner led them to the conclusion that organisms isolated from the suppurations of the upper respiratory tract and middle ear in albino rats suffering from lack of vitamin A, morphologically appearing as gram-negative cocci and classified as such by their fermentative powers, may produce a fatal toxemia in rabbits. It appeared that the poisonous effect was produced by an endotoxin rather than by a toxic substance secreted by the organism.

Our daily bread. Physicians and students of nutrition are reminded that the choice of white or whole wheat bread is practically one of personal preference, and that much of the advertising propaganda for the latter is misleading and exaggerated. Children may be intolerant of high cellulose foods such as whole wheat bread; it may be far too irritating. Man does not "live by bread alone," therefore it is not necessary to avert all the dietary shortcomings of the average loaf of bread and produce an ideal loaf. There are no perfect single foods.

Liver treatment in the pernicious anemia of pregnancy. A brief review of the literature and three case histories are presented by Peterson, Field and Morgan. The response to liver treatment seemed to be quite analogous to that obtained by such treatment in primary pernicious anemia.

Dietetic care of the vertical patient. Miss Geraghty mentions some of the problems which present themselves to those concerned with the dietary control of out-patients. Emphasis is placed upon the importance of adapting the diet to the customs of the

patient, of phrasing the diet requirement in easily understood terms, and of planning variety for those whose tastes are so inclined. If the dietary possibilities are outlined in a simple and concise manner, the patient is more likely to make a genuine effort to adhere to them.

Refrigerating systems and public health. Refrigerating systems are discussed from two angles, the fire hazard and health hazard. It is recommended that no refrigerating machinery room should be used for sleeping purposes; all machinery rooms should be properly ventilated, and those using irritant refrigerants should be properly segregated from the rest of the apartment; and a decision should be made as to which city department should make inspections of the refrigerating systems in tenement houses not at present inspected by the fire department or any other department.

Allergic insulin reactions. Since insulin is a protein-bearing compound and is administered in a manner that lends itself to the production of allergic reactions, it is suggested that these factors be borne in mind in treating diabetics and that manufactures specify on the package the animal source of their product.

Gastric disturbances. These discussions of diets for gastric and duodenal ulcer patients, tell of the adoption and use of three gradations of diet, known as routine 1, 2 and 3. Complete menus are drawn up, including lists of foods allowed the patient, suggestions for the rest of the family, dinner pail and restaurant suggestions, and complete directions for preparation of the various foods. Practical applications are given after the outlining of each routine.

Constipation. Diets for constipation are here detailed in the same manner as those for gastric disturbances. A "rough" diet and a "smooth" diet are described completely.

Vitamin balance. An instance of apparent vitamin imbalance has been cited by Harris and Moore, who studied growth rate of rats on a basal ration supplemented by both the vitamin B complex and a concentrate of cod liver oil containing vitamins A and D. It appeared that typical manifestations of a deficiency of one accessory food factor can be elicited through the antagonistic or depressive action of another.

Carbohydrates of almonds. Recent studies of almonds at the University of California have shown anew the presence of some sucrose, cellulose, pentosans, and not easily hydrolyzable hemicelluloses. Of all these one would scarcely expect any except the sucrose, amounting at most to three per cent of the nut, to have any great nutritive value. This is what the California experiments indicate. Almonds are not noteworthy glycogen formers. As is true of other foods principally composed of proteins and fats, there is a possible usefulness of almonds or almond meal in low carbohydrate diets such as are used for patients with diabetes and in the ketogenic dietetic treatment of epileptic children.

The Journal of Biological Chemistry

Vol. 85, February, 1930

The effect of vitamin D and of reaction of diet upon response to parathyroid extract. A. F. Morgan and A. E. Garrison.—p. 687.

The absence of calcium in the human red blood cell. S. L. Leiboff.—p. 759.

*Variations in blood and urinary sugar after the ingestion of galactose. V. J. Harding and F. H. van Nostrand.—p. 765.

Presence of aluminum in animal and plant matter. L. Kahlenberg and J. O. Closs.—p. 783.

Vol. 86, March, 1930

*The retention of nitrogen, calcium, phosphorous and magnesium by pregnant women. C. M. Coons and K. Blunt.—p. 1.

Metabolism of women during the reproductive cycle. I. Calcium and phosphorous utilization in pregnancy. I. G. Macy, H. A. Hunscher, B. Nims and S. S. McCosh.—p. 17.

Metabolism of women during the reproductive cycle. II. Calcium and phosphorus utilization in two successive lactation periods. H. A. Hunscher. 37.

Metabolism of women during the reproductive cycle. III. Calcium, phosphorous and nitrogen utilization in lactation before and after supplementing the usual home diets with cod liver oil and yeast.

I. G. Macy, H. A. Hunscher, S. S. McCosh and B. Nims.—p. 59.
Does cabbage fed to rabbits increase serum calcium? A reply to Kapainow and Underhill. K. Culhane.—p. 113.
*Long-time feeding experiments with activated ergosterol. C. A. Bills and A. M. Wirick.—p. 117.
*Dietary factors influencing calcium assimilation. XIII. The influence of irradiated yeast on the calcium and phosphorus metabolism of milking cows. E. B. Hart, H. Steenbock, O. L. Kline and G. C. Humphrey.—p. 145.
An inheritance study of the distribution of vitamin A in maize. III. Vitamin A in hybridredmaize. S. M. Hauge.—p. 161.
An inheritance study of the distribution of vitamin A in maize. III. Vitamin A content in relation to yellow endosperm. S. M. Hauge and G. F. Trost. —p. 167.
Rickets in rats. XI. The alteration of calcium and phosphorus metabolism of normal and ricketic rats produced by irradiated ergosterol. H. B Brown and A. T. Shol.—p. 245.

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A note on the determination of iron in milk and other biological materials. C. A. Elvehjem.—p. 463.
Purine metabolism. III. Diet and caging as factors in the allantoin excretion of the rabbit. A. A Christman.—p. 477.
Tissue metabolism. I. The nature of phlorhizin diabetes. E. Shoor, R. O. Loebel and H. B. Richardson.—p. 529.
Tissue metabolism. II. The respiratory quotient of normal and diabetic tissue. H. B. Richardson, E. Shorr and R. O. Loebel.—p. 551.
The metabolism of the phospholipoids. I. The influence of diet on the amount and composition of the phospholipoid fatty acids in various tissues of the cat. R. G. Sinclair.—p. 579.
*On the nature and rôle of the fatty acids essential in nutrition. G. O. Burr and M. M. Burr.—p. 587.
*The basal metabolism of young college women in Florida. J. Tilt.—p. 635.
*Studies in the chemistry of vitamin A. O. H. Cady and J. M. Luck.—p. 743.

Variations in blood and urinary sugar after the ingestion of galactose. Small amounts of galactose are always found in the urine after galactose ingestion. Marked increases in blood glucose have been noted, though the only sugar found in the urine has been nonfermentable. It is suggested that galactose is more rapidly converted into glucose than has previously been supposed.

The retention of nitrogen, calcium, phosphorus and magnesium by pregnant women. The nitrogen retention tended to vary chiefly with the intake. The calcium retention showed a tendency to rise toward the end of pregnancy. Phosphorus retention tended to rise to 0.15 to 0.20 gram per day by the fifth month, and then to remain at a level of 0.20 to 0.30 gram until the end of pregnancy. A high magnesium intake had no effect on calcium retention.

Long-time feeding experiments with activated ergosterol. Activated ergosterol administered to rats showed no harmful effects in doses one hundred times greater than the minimum dosage. One thousand times over dosage was only slightly harmful and 40,000 times over dosage strongly toxic. The toxic action was more powerful when accompanied by calcium carbonate, and slightly lessened by disodium phosphate.

Dietary factors influencing calcium assimilation. The influence of irradiated yeast on the calcium and phosphorous metabolism of milking cows. Irradiated yeast, potent in vitamin D, showed no positive influence in improving the calcium assimilation of milking cows, although vitamin D was absorbed into the blood as evidenced by the enrichment of the milk in this factor. The per cent of calcium and phosphorous in the milk was not changed by the feeding of irradiated yeast.

On the nature and rôle of the fatty acids essential in nutrition. Fat-free diets regularly produce kidney lesions in the rat, while high protein diets seem to increase the severity of kidney degeneration. Ovulation and normal sex responses are definitely affected. Saturated fatty acids will not cure rats suffering from this low fat disease; linoleic acid will cure the disease, however, which proves it an essential fatty acid.

The basal metabolism of young college women in Florida. The average metabolism of a group of fifty-two subjects at Florida State College for Women is 9.9 per cent (Harris-Benedict Standards). The change in season produced no metabolic change and

increased activity showed the subjects to have an average metabolism agreeing closely with the average of the entire group.

Studies in the chemistry of vitamin A Results of the effects of various chemical substances upon vitamin A. It was concluded that vitamin A activity is the property of a specific atomic grouping rather than a specific molecule.

Journal of Home Economics

Vol. 22, January, 1930

*Grape juice, nitrogen retention, and urinary acidity.—L. M. Pickens and R. A. Hetler.—p. 44.

Vol. 22, February, 1930

Training of hospital dietitians.—M. Koehne—p. 98.
Scientific society of hygiene and nutrition. J. Alquier.—p. 105.
*The vitamin A, B and G content of malted milk. E. J. Quinn and L. B. Brabec.—p. 123.

Vol. 22, March, 1930

*Mineral oil treatment of milk.—M. B. MacDonald, E. C. Andes, F. A. Briggs.

Grape juice, nitrogen retention, and urinary Acidity. In a report of experiments on women subjects on a basal diet, and on the same diet supplemented by grape juice, it was found that grape juice stimulates nitrogen retention, probably due to the protein-sparing action of the carbohydrates of grape juice. Large quantities of grape juice had no effect on the acidity of urine.

The vitamin A, B, and G, content of malted milk. This is a report on determinations of amounts of vitamins A, B (B) and G $(B)_2$ in two common brands of malted milk powder. Both brands were good sources of all three vitamins. Vitamin value of A is forty-five units per gram; of B (B), 20 to 25 units per gram; vitamin G (B_2), twenty units per gram.

Mineral oil treatment of milk. Experiments on a certain process for the removal of odor and flavor from "onion" milk by means of mineral oil, showed that there was no deleterious effect on the physical, chemical or nutritive value of milk.

Journal of Nutrition

Vol. 2, March, 1930

*Studies on the destruction of vitamin C in the boiling of milk. E. W. Schwartze, F. J. Murphy, and R. M. Hann.—p. 325.
*A study of the vitamin B complex of red kidney beans and polished rice. J. H. Axtmayer.—p. 353.
*The gaseous exchange of the human subject. I. As affected by the ingestion of water at 37.0°C. T. M. Carpenter and E. L. Fox.—p. 359.
The gaseous exchange of the human subject. II. As affected by small quantities of dextrose. T. M. Carpenter and E. L. Fox.—p. 375.
*The gaseous exchange of the human subject. III. As affected by small quantities of levulose. T. M. Carpenter and E. L. Fox.—p. 389.
*Experimental nutritional polyneuritis in the rat. M. R. Samuels.—p. 409.
*Further experiments on the influence of food upon longevity. H. C. Sherman and H. L. Campbell.—p. 415.

Destruction of vitamin C in the boiling of milk. Twenty per cent of the antiscorbutic vitamin was destroyed when milk was lightly boiled for five minutes. Milk obtained from cows fed on ensilage was equally as potent in vitamin C as milk from cows on pasturage.

Vitamin B complex of red kidney beans and polished rice. Red kidney beans and polished rice were studied for vitamin B values. Polished rice was deficient in vitamin B factors. Red kidney beans are richer in vitamin B_2 $(B)_1$ than in vitamin B $(B)^2$. The customary rice and bean diet of the Porto Ricans is therefore deficient in vitamin B factors.

Gaseous exchange of the human as affected by ingestion of water. Using a human subject, an experiment on the respiratory exchange in the post-absorptive state was measured for a period of one hour before, and for three and one-half to four and one-half hours after, the ingestion of fifty to five hundred cubic centimeters of water at 37°C. The control experiments were made without water, and measurements of metabolism were made for both experiments by the Benedict Universal and by use of the Gasometer Method. The course of carbohydrate metabolism and the heat production changed

little, if at all, in the experiment without water and in the experiment with less than two hundred cubic centimeters of water. With two hundred and fifty cubic centimeters of water, the metabolism increased, and with five hundred cubic centimeters there was a forty-two per cent increase. Amounts of water over two hundred cubic centimeters tend to cause a definite increase in metabolism of carbohydrates.

Gaseous exchange of the human as affected by small quantities of levulose. Three and one-half to four and one-half hours after the ingestion of levulose in amounts of from five to one hundred and four grams, taken in water at 37°C., the respiratory exchange of a human subject while in the post-absorptive condition was ascertained. Highest respiratory quotient was obtained during the second half hour after the ingestion of levulose. All groups showed an increase in heat production, varying from five-tenths calories in one hour after five grams of levulose, to forty-six calories in four hours. Minimum increase, in proportion to amount given, was one and five-tenths calories in two hours after the ingestion of twenty-one grams.

Experimental nutritional polyneuritis in the rat. Whether or not rats are a suitable animal for studies in the antineuritic vitamin is a question that has been raised, on noting that all rats do not develop polyneuritis. The conclusions drawn from this experiment leave no reasonable room for doubting that the rat will develop polyneuritis with sufficient regularity to be a valuable aid in determining the extent of the deficiency in the antineuritic vitamin to which he is subjected.

Influence of food upon longevity. There seems to be a general impression that heredity is the predominating factor in longevity. However, McCollum and others have shown that the life span may be made very variable by the degree of deficiency of the dietary. Two groups of animals of the same heredity were kept under identical conditions, except for difference in food. Diet A, containing more milk, and therefore more calcium, amino acids, and vitamins A and G, resulted in a long life span, but it is not yet determined to which factor the longevity was attributable. Food does seem to play an important part, and it is possible a longer life may be secured by an adequate diet, plus certain chemical factors.

The Modern Hospital

Vol. 34, February, 1930

*Two problems of a dietition. M. W. Northrop.—p. 126.

Vol. 34, March, 1930

*The satisfied patient—a product of the dietitian's art M. M. Fanning.—p. 134.
When and why the dietitian should confer with the architects.—p. 138.

Vol. 34, April, 1930

Solving problems of food service in a community hospital. C. Fazio and R. Resler.—p. 77.
*Applying the rules of nutrition to hospital feeding problems. K. Daum.—p. 128.

Two problems of a dietitian. A release from the routine non-technical work and a more adequate provision for the raw food and labor budget would solve, to a great extent, the hospital dietitian's problems.

The satisfied patient—a product of the dietitian's art. A review of the problems which arise in pleasing the hospital guest, together with an outline of the general responsibility of the dietary department to the patient, is given.

Applying the rules of nutrition to hospital feeding problems. The necessity of serving, and the benefits derived from serving an adequate diet to hospital patients and staff is pointed out, with ways and means of furnishing the essential foods to everyone.

Western Hospital and Nurses Review

Vol. 14, February, 1930

Nutrition in older children. A. J. Scott.—p. 26.
*Planning interesting meals. M. C. Cooke.—p. 38

Vol. 15, March, 1930

*California dairy control program. M. E. McDonald.—p. 27.
Food poisoning. Editorial.—p. 31.

Vol. 15, April, 1930

*The manufacture of ice cream. C. V. Duckworth.—p. 27.
*Acid base equilibrium. F. S. Modern.—p. 34.
Easter Sunday. V. Shriner.—p. 37.

Planning interesting meals. The essential factors of successful menu planning are outlined in a way which should simplify one of the dietitian's most difficult problems.

California dairy control program. An outline of the work of the Bureau of Dairy Control of California, which is concerned with the maintenance of high standards of quality for dairy products, is given.

The manufacture of ice cream. The laws and regulations governing the ice cream industry assure a wholesome and clean product.

Acid base equilibrium. Ideal diets must be adequate and palatable. Slight excess, either of alkali or acid, is taken care of easily by the body. In covering the protein requirement, acid food materials must be used; in supplying carbohydrate, basic materials are used, hence an imbalance in the acid-base equilibrium is usually due to basic dietary deficiencies.

NEWS NOTES

The Thirteenth Annual Convention of the American Dietetic Association will be held at the Royal-York Hotel, Toronto, Canada, September 8, 9, and 10. This is the first time the Association has met outside the United States, and will afford an opportunity to many to visit not only one of the most interesting medical centers in North America, but a city well known for its beauty and historical interest.

Dr. Malcolm T. MacEachern, Director of Hospital Activities of the American College of Surgeons, has been elected an honorary member of the American Dietetic Association.

The Third Annual Midwest Meeting of Dietitians, sponsored by the Chicago Dietetic Association, was held in Chicago on February 14th and 15th. Elsbeth Hennecker of Presbyterian Hospital was in charge of arrangements. Approximately one hundred and fifty dietitians, representing six states, were registered at the convention.

The opening session, Friday afternoon, February 14, was held in the Northwestern University Medical Building. Millie Kalsem, president of the Chicago Dietetic Association, presided. Mr. Paul Fesler, Superintendent of the University Hospital, Minneapolis, talked on "The Dietitian in the Hospital Field." He presented slides to indicate, in diagrammatic form, the relation of the dietitian to the hospital staff, and of the dietary employees to her, in the organization of the University of Minnesota and University of Michigan Hospitals. Dr. Milton T. Hanke of the Otho Sprague Memorial Institute, University of Chicago, discussed "The Relation of Diet to General Health and Particularly to the Oral Tissues and Dental Caries." He showed unusual colored slides of many of his patients. The point he emphasized concerning unhealthy gums was the result of his own research, namely, the common lack of vitamins C and D in the daily diet. He added to the usual diets of a number of patients, over a considerable period of time, one glass of milk or more, liberal amounts of lettuce, two eggs and one pint of orange juice, containing juice of one lemon, daily. Noticeable improvement in the condition of the gums followed in practically every case. M. Faith McAuley, Assistant Professor of Institution Economics, University of Chicago, spoke on "The Purchasing of Perishable Foods." In her interesting manner she discussed the points for the institutional buyer to remember concerning several of the more widely used fresh fruits and vegetables.

The dinner meeting at the Medinah Athletic Club, at which Miss Kalsem presided, was well attended. "Variety and Simplicity in Diabetic Diets" was the subject chosen by the speaker of the evening, Dr. Elmer Sevringhaus of the University of Wisconsin. He outlined the simplified system of handling diabetic diets worked out at Madison General Hospital. Music and after dinner speeches by members of the local group closed the evening.

Saturday afternoon at Cook County Children's Hospital, Miss Hennecke presided. Dr. Maurer of the Otho Sprague Laboratories presented an interesting paper on "Pernicious Anemia." His suggestions were offered as a result of the work he is now doing. The importance of foods high in iron was stressed, and, in particular, the satisfactory results obtained from the use of desiccated swine's stomach. He reported, also, the apparent relationship between mental deficiencies and inadequate vitamin B diets. At the same meeting, Dr. Blatt, Medical Director of Cook County Children's Hospital, presented a paper on "Principles Underlying Infant Feeding." The convention

ended with a tea given by Miss Kalsem and her staff at Cook County Hospital.

The Baltimore Dietetic Association has been having a full calendar this past winter. For the monthly field trip in February, the Association was invited to the H. M. Wagner Company for a combined luncheon and inspection of their food products. Before luncheon was served, a complete display of their canned foods in gallon tins, for institutional use, was shown. Following luncheon, a talk on the pea canning industry was given by a representative of a large middle western firm. This was followed by a moving picture showing coffee raising in Brazil, and then other short talks relating to the Wagner products were given. The members of the Association left with a feeling of gratitude to the Wagner Company for their hospitality, and for further acquainting the Association with their line of products.

For the March field trip, the members of the Association were guests of the Kingan Provision Company, at which time a "protein luncheon" was served. The Kingan products are essentially protein foods; even the dessert of mince pie clung to the Kingan brand. A variety of meat and cheese products were on display, and a demonstration was given by a commercial representative, showing the use of Puritan oil, a newer and less expensive oil, for salad dressings. Following the demonstration, a trip was taken through the plant to see the many processes in the preparation of the meats.

The annual dinner meeting of the Association was held at the Southern Hotel, the evening of March 3rd, at which time Dr. Walter H. Eddy, Professor of Physiological Chemistry, Columbia University, New York City, gave an address. Dr. E. V. McCollum, of the School of Hygiene, Johns Hopkins University, and Dr. Maurice Pincoff, Professor of Medicine at the University of Maryland Hospital, were guests of the Association, both giving brief talks.

One of the most interesting meetings in the year was held in Dr. McCollum's laboratory, in the School of Hygiene, Johns Hopkins University, on April 7th. Dr. McCollum spoke to the Association on "Progress in Nutritional Research," and Ernestine Becker gave a very instructive talk on the laboratory procedure in their research work. Her talk was illustrated with living models of rats from the laboratory.

Janet Whitney Bowers, of Maine, New York, a former dietitian of Baltimore and New York City, was a patient recently at the Johns Hopkins Hospital.

Miriam C. Connelly, chief dietitian of the University of Maryland Hospital, is doing some consulting work for the welfare centers, City Health Department.

An experiment to determine whether the school lunch-room can function in the school health program is being tried in one of the Baltimore Public Schools. The work is being done, under the supervision of Mary Faulkner, City Supervisor of Home Economics, by Martha Squires Baltz, supervising dietitian, and Helen G. Andres of the Baltimore Dairy Council. An adaptation of the health habits program reported in "A School Lunch-Room Study" by Ethel Austin Martin of the National Dairy Council has been used. The preliminary work consisted of "height-weight," "health habits" and "lunch selection" surveys. The project was launched in a school assembly program through a playlet called "Cafeteria—Whats and Whys." Instruction was also given in the home rooms regarding the selection of well-balanced meals. Lunches were checked and rated as the children passed the cashier's desk. If a part of the lunch was brought from home, an effort was made to teach the children to supplement it wisely. A yellow card rating the lunch an "A" was placed on trays containing adequate lunches; pink cards showed a shortage of milk; green cards showed a shortage of either fruit or vegetables; and blue cards showed a need for more substantial food. To sustain the children's interest in the project, carefully planned teaching units and devices have been used. The experiment, so far, has shown that such procedure will increase the sales of milk, fruits and vegetables. There was a decided increase in the number of "A" lunches sold. It is hoped that a city-wide

campaign can be carried on in the school lunchrooms next year.

The John Hoos Company of Baltimore recently introduced the Hotel and Restaurant Equipment Show. Many prominent manufacturers of kitchen equipment arranged for exhibits and sent their factory experts. One evening was assigned to dietitians. The exhibits were of great practical value and assistance in the preparation and cooking of food. Various wholesale dealers of the city displayed foods and a dinner was served to the dietitians.

A group of Baltimore dietitians attended the Commencement Exercises of the Walter Reed Hospital, March 28th, and remained for the dinner given in the evening by the Washington Dietetic Association.

The Chicago Dietetic Association devoted its March meeting to a discussion of dietetics in relation to modern business. Mrs. Leone Rutledge Carroll gave a talk on "The Dietitian in the Business World." Mary Finnegan, former dietitian at the University of Michigan Hospital, and now production manager of a Chicago Restaurant, discussed "An Apprenticeship Training in the Restaurant Field."

The program of the April meeting covered another interesting field. Dr. C. Robert Moulton, director of the Department of Nutrition of the Institute of the American Meat Packers, spoke on "Some Experiments with an All Meat Diet."

Nineteen new members have joined the Association since the first of the year.

The Cincinnati Dietetic Association met at the Y. W. C. A. for a dinner meeting in February. Miss Bryant of the Home Service Department, Union Gas and Electric Company, invited the Association to hold its March meeting in her model kitchen and demonstration room and gave a talk on "Some Aspects of Commercial Work." Dr. Oscar Berghausen was the speaker at the April meeting. His subject was "Sugar Tolerance," illustrated with lantern slides. Announcements have been received of the marriage of Maybelle Morgan, formerly dietitian at Bethesda Hospital, to Dr. Wesley Damerow. Her position has been taken by Ruth Sentiff. Hazel Fullriede of Nebraska City, Nebraska, has accepted a position as assistant at the Childrens' Hospital.

The District of Columbia Dietetic Association held its second benefit bridge party at the Dodge Hotel in February. Anna E. Boller, President of the American Dietetic Association, was the guest of the Association at a dinner given at the Garden House of the the Dodge Hotel in March. She gave an enjoyable talk on the history of the Association since its beginning in 1917, and its plans and activities. Guests from the Richmond and Baltimore Associations were also present. In the afternoon preceding the dinner the dietitians of the District and guests attended the graduation exercises of the student dietitians at Walter Reed Hospital. Miss Boller congratulated Grace Hunter, chief dietitian, on her accomplishments with the dietetic training school. She also invited the new graduate dietitians to become members of the American Dietetic Association. At the regular April meeting, held at Mount Alto Hospital, Dr. Wolford gave an interesting talk on the treatment of pernicious anemia with a liver diet. A short business meeting for the election of officers for the ensuing year was then held. Grace Bulman, Superintendent of Dietitians, U. S. Veterans' Bureau, was re-elected President. Ruth Atwater of the National Canners Association was elected Vice-president. Lurena Perrine, head dietitian of Garfield Hospital was re-elected Secretary. Mildred E. Parker, chief dietitian of St. Elizabeth's Hospital was re-elected Treasurer.

Dr. Lillian Storm of the Home Economics Department of the American Bottlers of Carbonated Beverages has resigned her position to do educational and nutritional work with Gerber Strained Vegetables, which are put out by the Gerber Products Division of the Fremont Canning Company of Fremont, Michigan.

Blanche Fickle is the new head dietitian at Gallinger Municipal Hospital, coming here from the Rochester Diet Kitchen. Lucille Refshauge, a graduate of Lincoln University, Rochester, Minnesota, is the new assistant dietitian at this hospital.

The Grand Rapids Dietetic Association members were hostesses to the Southeastern Michigan Dietetic Association the third week in May.

Margaret Flimm, a graduate of Michigan State College, Lansing, has started her student dietetic training at Butterworth Hospital, Grand Rapids.

The New York Association of Dietitians. At the March meeting of the Association, Dr. F. Elmer Johnson spoke on "Infant Feeding." "The Education of the Dietitian" was the subject of a round table discussion at the April meeting.

Lenna F. Cooper, Food Director of the University of Michigan, and Consulting Dietitian at the Battle Creek Sanitarium, with which she has been associated for twenty-two years, has been appointed Supervising Dietitian at the Montefiore Hospital, New York. Miss Cooper served as chief dietitian of the United States Army during the World War and is co-author of several standard text-books on nutrition and dietetics.

Winnifred C. Conwell, formerly chief dietitian at the Knickerbocker Hospital, New York, has recently taken over the duties as the chief dietitian at the New York Homeopathic Medical College and Flower Hospital, New York City.

The Philadelphia Dietetic Association has taken a definite step forward in adopting an original and unique arrangement of its program. Aside from the monthly meetings, bi-monthly group conferences were instituted as an experiment, and have more than fulfilled highest expectations of success as to attendance and interest. Some of the subjects chosen were diet therapy, standards for buying canned goods, and nutrition and education, with authoritative speakers on each subject. The organization has undoubtedly gained in enthusiasm and worthwhile knowledge from the group conferences.

In the January issue of *Hospital Management*, an article on diet therapy by Helen E. Gilson, Chief Dietitian of the Pennsylvania Hospital appeared. In the past year Miss Gilson also prepared and published, in conjunction with The Onondaga Pottery Company of Syracuse, New York, a booklet entitled "The Perfect Tray," in the interest of standardization for equipment and servicing of trays for hospitals.

Gertrude D. Peabody has been appointed Dean of Women at Teachers College, Temple University, having held the position as Director of Home Economics at the same university. Laura W. Drummond, who was Instructor in Nutrition at Temple University, succeeded Miss Peabody as Director of Home Economics.

Emma Smedley, Director of School Lunches, Philadelphia, has just published a revised edition of her book "The School Lunch." It has been greatly enlarged and is well illustrated, it also gives in detail the system of accounting which has just been introduced in the Philadelphia Public School Lunch System. A fifth edition of "Institution Recipes," by Miss Smedley, has just been put out in the past year.

The Porto Rican Dietetic Association was organized in April, according to information received from Mrs. Rita R. Lang, dietitian of the San Juan District Hospital.

The Southeastern Michigan Dietetic Association held its February meeting at the Women's Hospital in Detroit. Miss Menckye of the Personnel Department at Hudson's spoke on "Personnel and Management."

Dr. John Sundwall, Professor of Public Health and Hygiene at the University of Michigan, spoke to the members of the Association on "The New Public Health Problems" at the March dinner meeting held at the Women's League Building in Ann Arbor.

A dinner meeting was held in April at the Women's College Club, Detroit. Dr. Leo Bartemeir discussed "Personality Problems in Relation to Dietetics."

Martha Alderman, a former student at the University Hospital, is now at the North End Clinic, Detroit. She has recently returned from Boston, after having had some work with Miss Stern at the Boston Dispensary.

Frances Floore, of the Pediatric Department of the University Hospital, has resigned. Her position will be filled by Lucile Streater

of Winona, Minnesota. Miss Streater, a former student of the University Hospital, worked for Miss Foley at the Mayo Clinic for one and one-half years, and later did graduate work at the University of Washington.

The American Red Cross Nutrition Service has recently issued a series of interesting narrative nutrition reports. In Chattanooga Chapter, Chattanooga, Tennessee, one hundred forty-seven classrooms were visited one month, including those in four colored schools. Two rather vivid and distinctly interesting movies as a combined reading, art and nutrition project, featured the work of the third grades in their study of milk, with every child in the grades taking part in the shows. Pictures were made by the pupils. During the same month the nutritionist spoke on the nutrition work in Chattanooga to the Chatanooga Chapter of the American Association of University Women, with about fifty members present.

In East Carroll Parish Chapter, Lake Providence, Louisiana, a nutrition feature has been the class of mothers on the Desona Plantation. These mothers have had few advantages and the majority cannot read, but they seem to enjoy their nutrition class.

Ten home visits were made one month in Montgomery County Chapter, Rockville, Maryland. A good way of checking up on the number of conversions from coffee-drinking to milk-drinking has not been devised. The report is received from teachers, mothers, supervisors, and nurses, and some from letters written by the children to the nutritionist. Not only is checking a problem, but rechecking is a greater problem, for during the course of a year the back-sliders have to be reckoned with.

In Smith County Chapter, Tyler, Texas, the nutritionist has received several calls from mothers to visit them in their homes and to advise them on their babies' diets. Usually the mother is prompted to see the nutritionist on the advice of some other person who has consulted the nutritionist and has received helpful information. There was a call for a diet to reduce the acidity of the body, one for cardiac disease, five for infants, eight for the inclusion of vitamins to reduce the tendency to respiratory diseases, or infections, for pellagra, two for building up the body, one pre-natal diet.

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